

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The "Superior."

BY E. D. LEAVITT, JR.

The subject of the following paper is the compound hoisting engine now building by the I. P. Morris Co., of Philadelphia, for the Calumet and Hecla mine. It is the fourth engine of its kind ordered by the Calumet and Hecla Mining Co., for whom the design was first specially made in 1874, and by reason of greatly exceeding its predecessors in size and power, it has been named the "Superior."

A brief history and description of this type of engine may be of interest. Engine No. 1 was built in 1874 for pumping the water required by the separating and dressing machinery at the company's stamp mills,

had its low-pressure cylinder placed vertically, and its high-pressure cylinder at an angle of about 15 degrees from vertical. One pump was situated in the same center line with the low pressure cylinder, thus allowing the steam and water pistons to be rigidly connected. The pump at the high-pressure end of the beam was also vertical and worked by a trunk connection from the beam. Although the first engine was built with the intention and expectation that it would have a large surplus capacity, the additions to the works were so large before it was put in operation that it had to start at a speed greater by 25 per cent. than its intended maximum, and before it had run one year, this speed was nearly doubled.

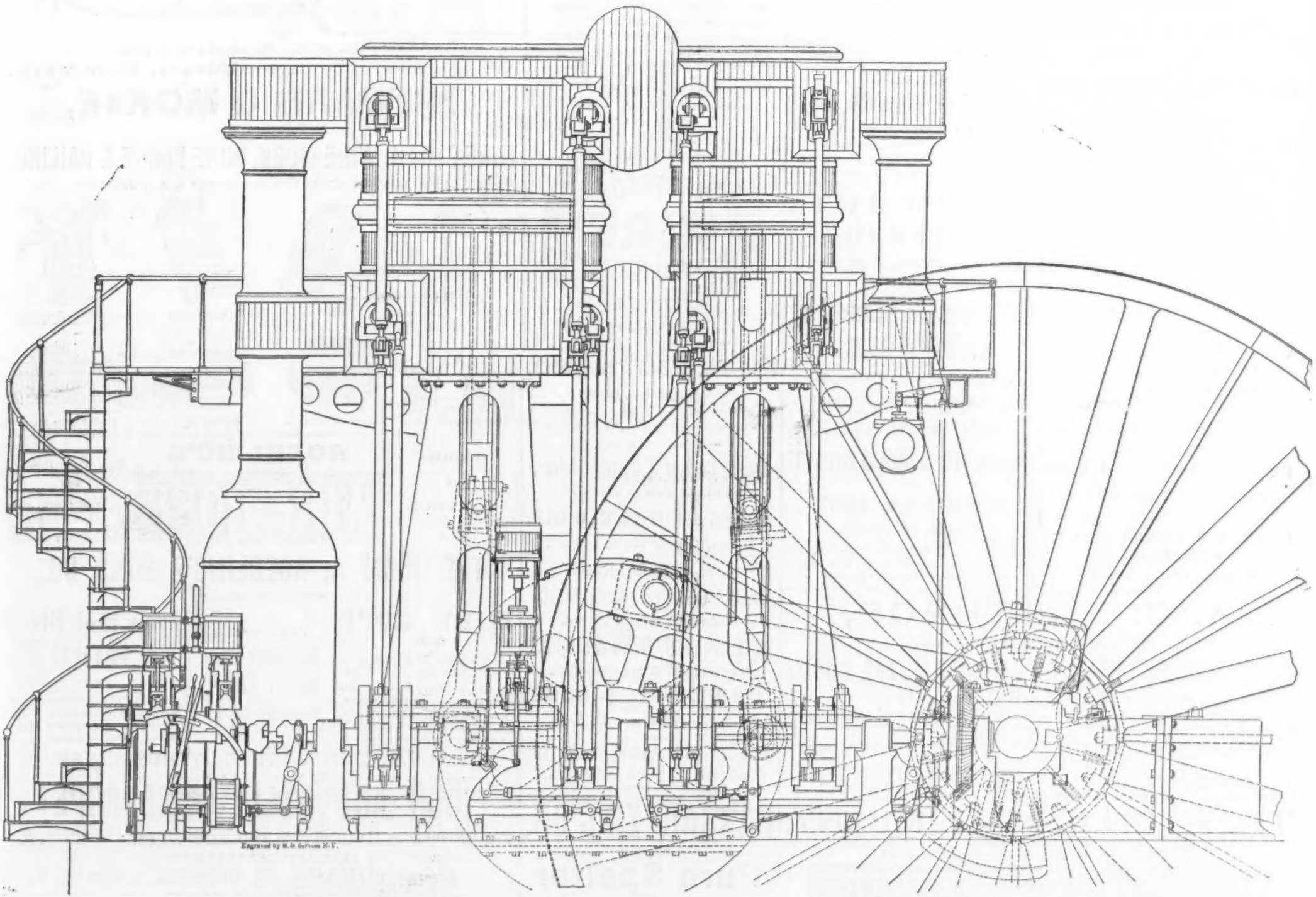
The great demand for water at the stamp mills, and the success of the first engine in supplying it, decided the authorities of the

in 1877. It is employed to drive four hoisting drums, each 24 feet diameter and weighing 70 tons; also, a pair of 28 x 48-inch air compressors, the rock breakers and other mine machinery. Its load is exceedingly variable, running from flying light to 650 horse-power. The cylinders were originally 18 and 36 inches diameter by 5 feet stroke, but for the purpose of increasing the power of the engine two new cylinders have recently been made, having diameters of 22 3/4 and 38 inches. The Hecla hoisting engine makes 48 revolutions per minute and runs 20 hours per diem. The extreme variability of the load was considered a condition directly opposed to a first-class economy, and the constructor's guarantee was four pounds of Brier Hill coal per horse-power per hour, the coal to be of such quality as should evaporate 7 7/10

ation. To accomplish this, the cylinders have been thoroughly steam jacketed on sides and ends and the exhaust from the high-pressure cylinder is passed through chambers filled with small brass tubes, through which steam of boiler pressure circulates. There are two of these chambers (which are called reheaters) placed between the cylinders, one at either end, and each contains about 700 square feet of heating surface. The arrangement is shown on the side elevation of the engine.

The "Superior" has both high-pressure and low-pressure cylinders, placed vertically, the distance between centers being 9 feet. The diameter of the high-pressure is 40 inches and of the low-pressure 70 inches; each has 6 feet stroke of piston, and the speed will be 60 revolutions per minute. The reheaters that connect the cylinders are oblong cham-

6-tooth the stroke. This is accomplished by making the cam in two parts, one for opening, and the other for closing the valves. The opening part is made fast to the cam shaft, but the closing part is driven through a sleeve, which has a key slot running its entire length; the shaft inside the sleeve has a spiral key-way, and a key is fitted to it and to the slot in the sleeve. This key is also made fast to a sliding collar, which embraces the sleeve, and is capable of being moved back and forth by a yoke and lever. This lever receives its motion from the piston of a small steam cylinder, the valve of which is operated by the governor in such a manner that the position of the piston is definitely fixed by the position of the governor balls. Abundant power for moving the collar is thus provided, in combination with a very delicate and sensitive Porter



SIDE ELEVATION OF "THE SUPERIOR." DESIGNED BY E. D. LEAVITT JR., FOR THE CALUMET AND HECLA MINE. BUILDING BY I. P. MORRIS & CO.

which are situated at Lake Linden, Mich. It was an outcome and departure from the Lynn pumping engine, the arrangement of cylinders with their outer ends placed near together, and their pistons connected to opposite ends of a beam, being retained, together with the valve gear. The departure from the Lynn engine consisted in inverting the cylinder, placing the beam below them, with its journals carried in pedestals on the main bed-plate, and so constructing the beam that the connection from it to the crank was situated above and between the piston connections. The position of the shaft was by this means brought very nearly in the same horizontal plane as the main beam center, its distance from the same being a little greater than the length of the connecting rod.

Two pumps were used in this engine, one being located at each end of the beam, and both were hung to and below the bed-plate. The latter consisted of a pair of deep hollow girders, placed parallel and bolted at their ends by heavy foundation piers. This arrangement afforded excellent facilities for getting at the pumps.

It should be stated that this No. 1 engine was a paper read before the American Society of Mechanical Engineers.

Calumet and Hecla Company to build a second pumping engine in 1876, of more than twice the nominal capacity of the first, and a third engine, to be used for hoisting and general machinery driving at the Hecla mine. The second engine was very like its predecessor, save in the construction of the pumps. The latter were fitted with differential plungers in lieu of buckets and plungers, and the change has proved a good one. The No. 2 pumping engine was put in regular service early in December, 1876, and has run constantly 144 hours per week since that date, save on weeks having legal holidays and one entire week, when it was laid off to test the pumps of the No. 1 engine after they had been fitted with improved valves. During the period of its operation it has made 40,000,000 revolutions, and raised approximately 13,000,000 gallons of water, against a dynamic head of 51 feet. It has neither required nor received any repairs. The dimensions of the No. 2 pumping engine's cylinders are 17 3/4 and 36 inches diameter by 5 feet stroke; and of the pumps, 20 and 28 5/16 inches diameter of plungers by 5 feet stroke. The usual speed is 24 revolutions per minute. The third engine was erected at the Hecla mine in the fall and winter of 1876 and 1877, and started early

pounds of water per pound of coal from and at 212 degrees. On a trial of five days, in May, 1877, the coal averaged 3 3/4 pounds per horse-power per hour, and the evaporation 7 42-100 pounds of water per pound of coal from and at 212 degrees. During a trial extending from December 21, 1880, to January 1, 1881, the consumption of coal was found to be 2 13-100 pounds, and of feed water 16 3-10 pounds, per horse-power per hour. The power during the latter averaged more than double the average exhibited on the preceding trial.

In 1878 a design was commenced for an engine of 1500 horse-power to be located at the Calumet mine. Before the drawings were completed it was deemed judicious to increase the size of the engine to 2500 horse-power, and a contract for the same was entered into in the fall of 1879. In designing this engine the economical advantages of "high pressure" and high piston speed were carefully taken into consideration; 135 pounds per square inch was adopted for the former and 720 feet per minute for the latter. As the load when the engine is first put in service will be, on the average, but about one-fourth of its rated power, extra precautions have been taken to provide against losses due to internal radi-

ations in their transverse and vertical dimensions, and each contains 941 brass tubes, 3/4 inches diameter and 58 inches long. The live steam is inside, and the exhaust outside these tubes. By the use of diaphragms all the tube surface is made efficient.

The distribution of steam is effected by gridiron slide valves, which have a short horizontal travel. There are four valves for each cylinder, each being actuated by a separate grooved cam, so that its movements can be indefinitely controlled and adjusted. The valve gear consists of eight grooved cams fixed on a revolving shaft, which is driven by miter gears from the main crank shaft. The cam shaft is carried in bracket bearings, which are secured to the side of the main bed-plate, and, in addition, have feet which rest upon the engine foundation. The cams give motion to levers, which in turn communicate it to the bell cranks that move the valves; the connections between the levers and bell cranks are tubular. The cam levers are made of Chester cast steel; their pins and rolls are of hardened open-hearth steel. The throws of the cams are also of hardened steel.

The cut-off is effected by the high-pressure inlet valves, and is automatically controlled by the governor. The range is from 0 to

governor to determine when and how far it shall be used.

The cam just described operates two independent compound levers, one being required for each high-pressure inlet valve. The compound levers are so constructed that one part has a fixed pivot at one end, and a roll fitting the opening cam at the other end. At the middle of the length there is a stud to which the other part of the lever is pivoted. This lever is provided with a roll that fits the movable or closing cam, and it is situated about one-third of its total length from the pivoted end. The outer ends of these second levers are connected to vibrating cams that move the high-pressure inlet valve, the purpose of the vibrating cams being to allow the large amount of lost motion that is indispensable in obtaining a quick movement. As the travel of the inlet valves is but 1 inch, while that of the vibrating cams is 12 inches, a very sharp cut-off results. The low-pressure inlet valves are set to close at 35 inches from the commencement of the stroke. A full-sized drawing of the cams that move these valves is shown (and it answers for an example). The other cams are similarly constructed. It will be observed that the disk part of the cam is attached to a center that

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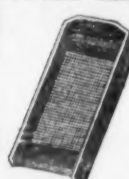
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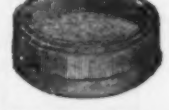
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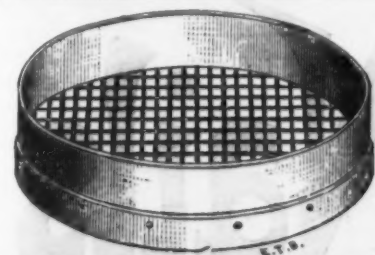
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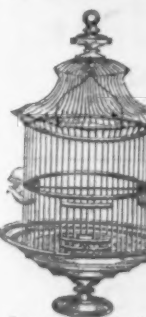
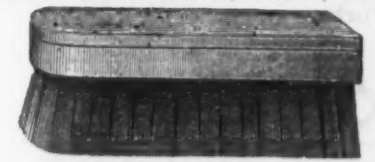
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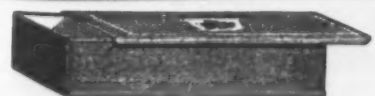
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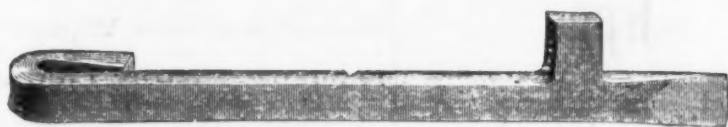
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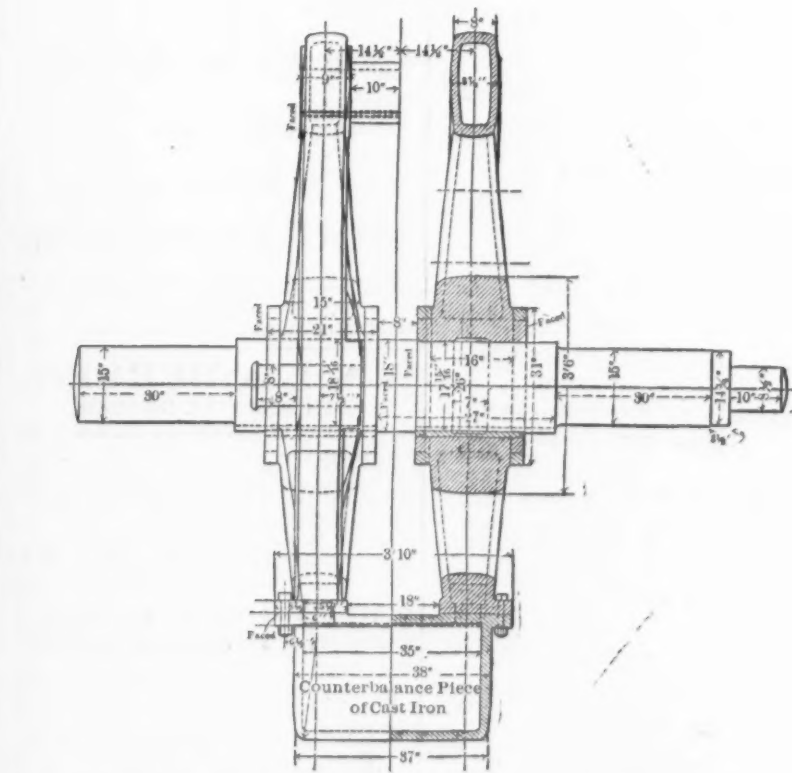
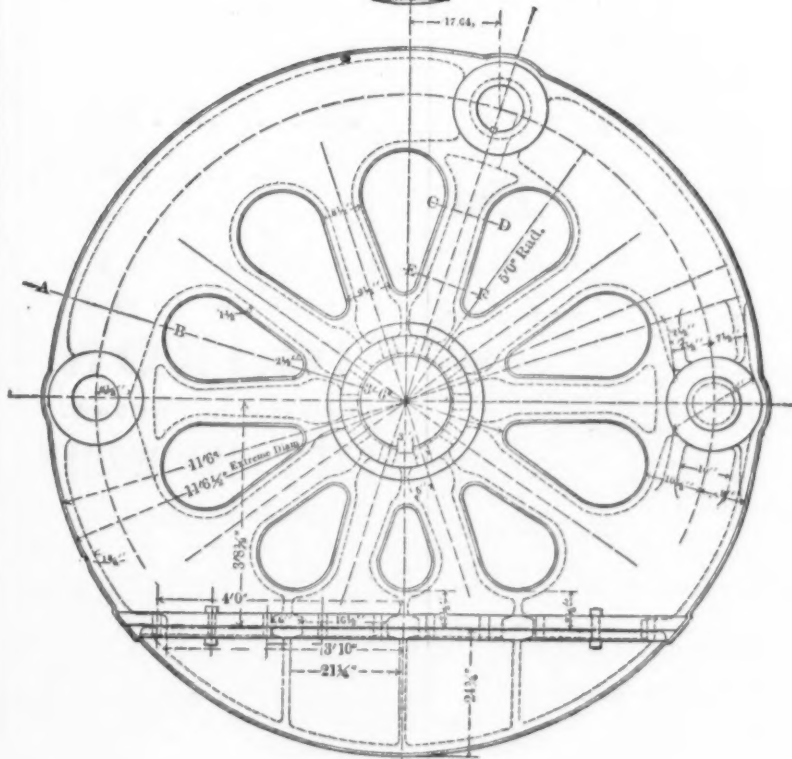
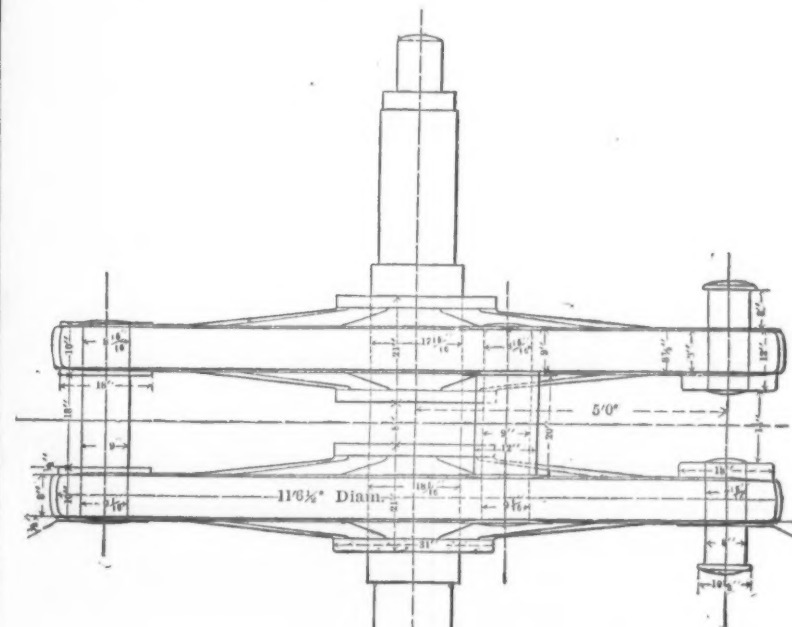
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is keyed to the cam shaft. These centers have a T-shaped groove, into which the bolt heads that secure the disks are fitted; this allows any amount of adjustment that can be desired, as will readily be seen.

The hand gear consists of a pair of small steam cylinders, which turn a cranked shaft that can be connected at will with the cam shaft by a clutch, the axes of the two shafts being in the same line. The miter gear on the cam shaft has also a clutch, which is con-

by four massive columns, which are secured to the bed-plate, and have suitable flanged facings at their upper ends, to which the feet of the cylinders are bolted. These columns also form the cross-head guides. The bed-plate is in four pieces—two sides and two ends—the back end forming the air-pump and channel way. The jaws for the crank-shaft and beam pedestal boxes are cast in the side pieces of the bed plate, all the journals being situated in the same hori-



TOP, SIDE VIEW AND SECTION OF THE ROCKER OR BEAM.

connected to the clutch on the small crank-shaft in such a manner that it must be thrown out of gear before the other can be put in gear, and vice versa.

The eccentrics for working the valves of the small cylinders are placed on a separate shaft that is turned by a hand-wheel. The eccentrics give motion to levers that are pivoted to other levers that receive motion from the pistons; a compound motion is thus imparted to the valves, with the result that the engines will stop immediately when the hand-wheel ceases to turn, because the motion imparted by the levers connected with the pistons will close the valve.

The main framing of the engine is formed

zontal plane. The gross weight of the bed-plate is 65 tons, each side piece weighing 21 tons.

The running gear of the engine, with the exception of the beam and crank throws, is of steel. The piston rods are respectively 6 3/4 inches and 7 inches diameter. The cross-heads, low-pressure link connecting-rod, main center, crank pin and shafts were made by Krupp, of Essen, and are beautiful work. The low-pressure link and the connecting-rod are of peculiar construction, as will be seen by the drawing. A jaw is formed for the boxes by cutting in from the side. A binder is then fitted, so as to hold the jaw from opening or closing, and the

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punched through at the proper angles and free

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kegs of unfinished shoes.

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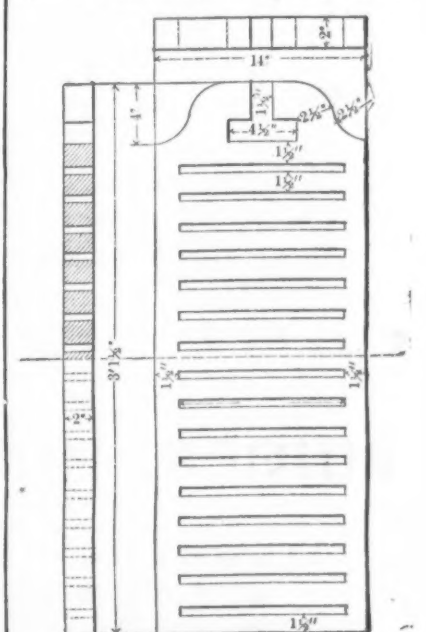
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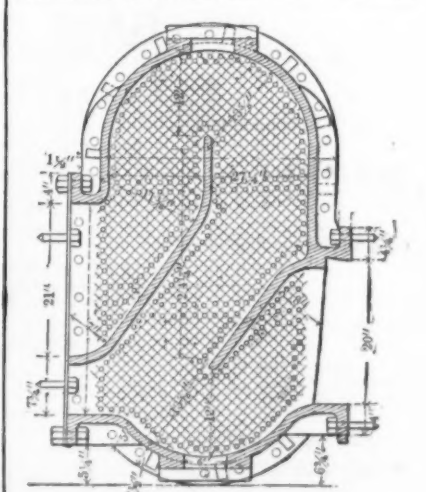
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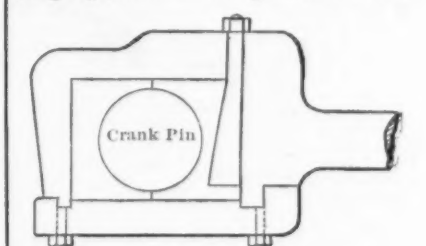
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to be of the very best workmanship and material; superior to the very best brands of English
Crown Chain, and specially adapted for rafting, mining and dredging.adjustment of the boxes is effected by a
wedge which is drawn up by a screw and
nut; two set-screws bearing against the
upper edge of the wedge hold it solid. The
boxes are also held solid by set-screws in

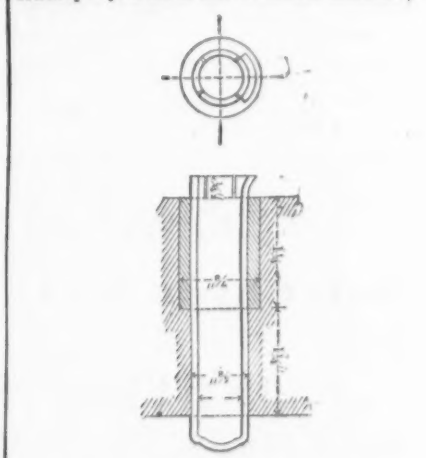
HIGH PRESSURE STEAM VALVE.

their flanges. The beam (or perhaps the
term rocker would be more appropriate) con-
sists of a pair of gun-iron wheels, 11 feet in
diameter, with the pins for piston, and crank
connections forced into the rims. The main

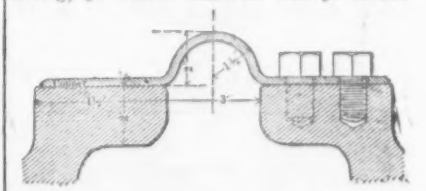
CROSS SECTION OF REHEATER.

center is 18 inches diameter on the body,
and 15 inches diameter in the journals,
which are 30 inches long.A heavy counterbalance casting is bolted
to the bottom of the beam wheels, its weight
being adjusted so as to equilibrate all the

END OF CONNECTING ROD.

vibrating parts. This is a matter of import-
ance, as these weights aggregate upward of
25 tons, and make 120 vibrations per min-
ute. The crank-shaft is 18 inches diameter
in the journals and 45 feet long over all the
journals, having a length of 32 inches. The
crank-pin journal is also 18 inches diameter,

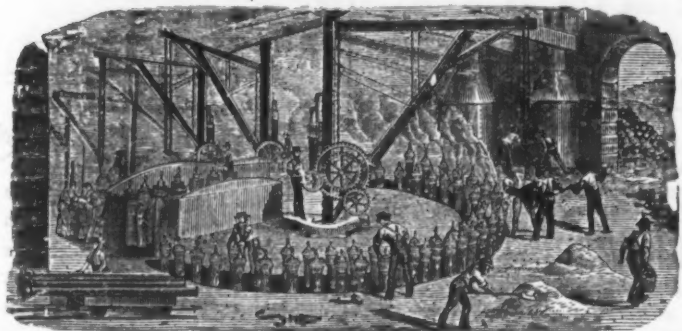
FITTING OF REHEATER TUBES.

and has a length of 24 inches. The crank
throws are made of the best charcoal scrap
iron, and weigh 4 tons each. The total
weight of the shaft is nearly 30 tons.
The air pump is horizontal and double-
acting, 30 inches diameter and 30 inches

SECTION OF EXPANSION JOINT IN JACKET.

stroke, and is worked by an arm on the end
of the main center. It is of the plunger
construction, and has water packing. The
valves are of rubber and have iron grids
for seats. There are two pulley fly-wheels,

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Warranted Equal to any Produced.

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SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface finish and exactness of gauge.

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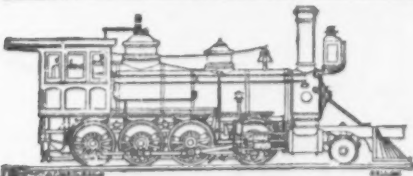
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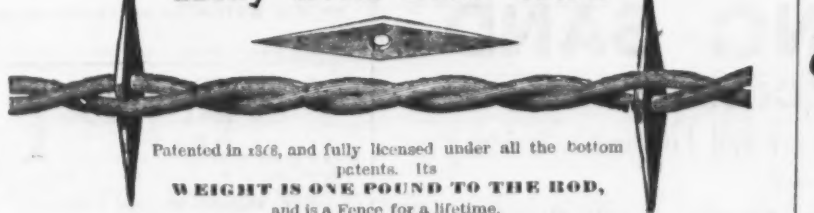
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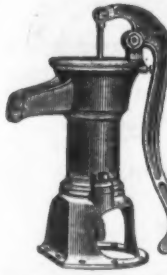
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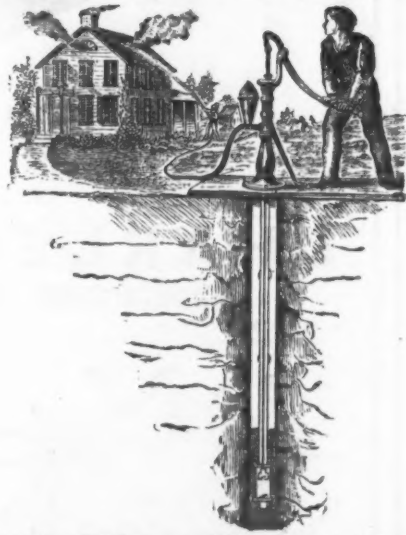
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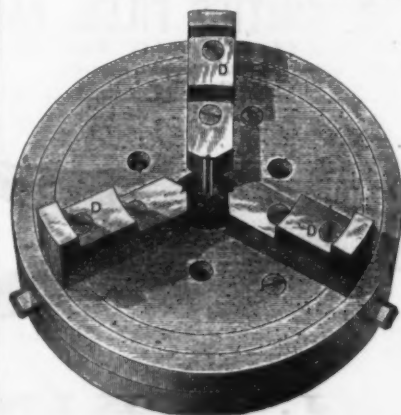
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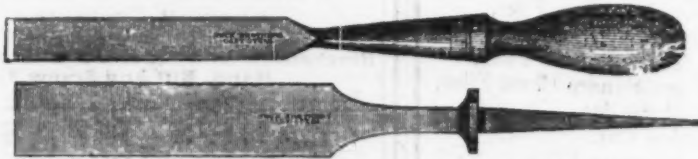
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These mines are situated in Putnam County, near Brewster, N. Y., and are in the vicinity of the "Tilly Forster" mine, which formerly belonged to the same parties. These mines are now sufficiently developed to show a uniform quality of ore, the openings being a tunnel in the mountain of about 200 feet in length and 20 feet above tide-water level. The following analysis of the ore was made by Prof. Thos. M. Drown, of Philadelphia, Pa.:

ANALYSIS.

Magn. Oxide of Iron.....	75.65	Metallic iron.....	55.42
Protoxide of Iron.....	.83	Metallic Manganese.....	.05
Manganese Oxide.....	.09	Phosphorus.....	.16
Alumina.....	4.41		
Lime.....	1.32		
Magnesia.....	.97		
Silica.....	14.89		
Phosphoric Acid.....	.37		
Sulphur.....	.42		
Titanic acid.....	.27		
Total.....	99.44		

We propose to offer the above F. O. B. at Port Morris, N. Y., at \$3 per ton for 50 per cent. ore.

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Brewster, Putnam County, N. Y.

each 32 feet in diameter, 32 inches face, and weighing 45 tons. Each consists of a center and 12 segments, an arm and a segment being cast together. As a precaution to resist danger from centrifugal force, the rim has 24 wrought-iron braces, 3 x 1 inches, in section securing it to the center. Each pulley will carry a 30-inch treble belt, which will have to transmit a maximum of 600-horse power, to be distributed by wire rope transmissions over a length of 2000 feet. One end of the crank shaft will be coupled to the pinion shaft of the hoisting drums, and the other end to a pinion shaft for driving two pairs of 32 x 48 inch air compressors. All this shafting is made of steel and varies from 12 to 18 inches diameter, being proportioned to transmit with entire safety the maximum power of the engine, which is estimated at 4700-horse power with six expansions. It is hardly necessary to remark that such an amount of power is not likely to be called for very shortly. The foundations are constructed of brick and stone masonry. They are 62 feet long, 18 feet wide, and 18 feet deep above the pocket holes (for bolts). They rest upon rock bottom.

For supplying steam to the "Superior," there will be five locomotive boilers, containing in the aggregate 260 square feet of grate and 11,000 square feet of fire surface. The dimensions of the boilers are as follows:

	Ft.	In.
Length extreme.....	33	4 13-16
Breadth of fire box at bottom.....	9	2 5/8
Height of fire-box extreme.....	9	9-16
Inside diameter of barrel.....	7	

Each boiler has two furnaces, 8 feet long, 4 feet wide and 5 feet 6 1/2 inches high above base ring; back of each furnace is a combustion chamber, 2 feet 11 inches long, extending into the barrel of the boiler, where the two unite in a single chamber, 4 feet 1 inch long, up to the front tube sheet. There are 118 iron tubes, 3 1/2 inches diameter outside and 18 feet long between the sheets. All the plating is of the best quality of open-hearth steel, varying from 5 16th inch in thickness, as used in the furnaces, to 9 16th inch in thickness for the circular shell. All the joints of the barrel are butts, with outside and inside straps, and are double-riveted throughout. The staying is proportioned for a working pressure of 135 pounds per square inch. The crown sheets are hung by bolts to wrought-iron arches, which are riveted to the roof of the boiler, and the bolts are so arranged that a man can pass the entire length of the crowns and examine every part. Access can also be had to the barrel below the tubes for its entire length. The boilers are supported by a cast iron ashpit at the furnace end, and three cast-iron cradles under the barrel; the cradles rest on iron balls, so as to move freely to accommodate the expansion. There is no brick setting. To prevent radiation there is careful clothing with non-conductors. Each pair of boilers will have a flue heater for the feed water, which is composed of brass tubes 2 1/2 inches inside diameter, and having several hundred square feet of exposed surface. By this method the water enters the boilers at 140 degrees and upward. The main steam pipe is of wrought-iron tubing, 12 inches diameter and about 75 feet long; it discharges into a receiver near the engine, which is 5 feet in diameter and 15 feet high. A short pipe, 12 inches diameter, connects the receiver with the high-pressure cylinder. It is expected that the "Superior" with three of its boilers will be completed the present season. In conclusion, the writer desires to put on record the fact that the creation of the plant to which the "Superior" forms the latest and greatest addition is due to Prof. Alexander Agassiz, the president of the Calumet & Hecla mine, whose forecast and sagacity as a man of affairs are only equaled by his skill as a scientist. An engineer by profession, he has the great advantage of being able to grasp engineering details, and thus fully comprehends what is often lost sight of—the axiom, that the best is the cheapest.

Alteration to the Cross-head of a Corliss Engine.*

BY CHARLES E. EMERY, PH. D.

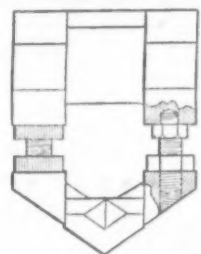
It will be remembered by the gentlemen present, in reference to engines with side frames carrying guides (usually of "V" shape) above and below the piston rod, as introduced years ago by Mr. Allen, of the Novelty Iron Works, New York, and made

piston up and down in the cylinder, and produce unequal wear, and frequently noise when the engine is heavily loaded.

The cause of the ill-working of pistons in Corliss engines in some cases was not generally understood, and gave rise to many changes of detail in the piston itself. Some suggestions were made by those who had ascertained the true causes of the difficulty, but it was not till a comparatively recent period that Mr. Corliss changed the form of his cross head for his larger engines to bring the bearing of the slides directly under the pin.

The writer recently had occasion to put in a second-class Corliss engine, with a cylinder 16 inches in diameter and 42 inches stroke of piston, which had a cross-head of the kind first above referred to, and considered the defect of sufficient importance to warrant the change in the construction of the lower gib, shown in the accompanying drawing.

As will be seen, the bottom gib is simply extended toward the crank, some little distance beyond the center of the cross-head pin, and small set-screws placed either side under the jaws of the spade handle to transfer the vertical thrust directly to side



ALTERATIONS TO THE CROSS-HEAD OF A CORLISS ENGINE.—END VIEW.

ears on the gib. The rear set-screw and jam nut are made with notched cylindrical edges, so that they may be adjusted with a set or chisel. Other details will be readily understood from the drawing. The arrangement operates well. Of course, the additional length of gib runs off the end of the guide, which is no objection, and, in fact, is utilized by placing there a small box, with pad, to lubricate the gib each time it reaches the end of the stroke.

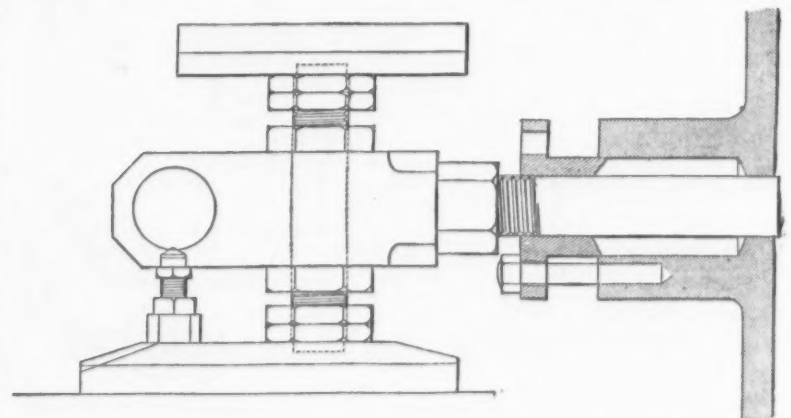
Seizures for Smuggling.

Added to the embarrassments which seem to be peculiar to American steamers in the Atlantic trade, is the liability to seizure and detention on account of the smuggled goods which may be found on board. The case is presented in the following letter addressed to the President of the New York Chamber of Commerce, by James E. Ward & Co., of the Havana line:

SIR: Inclosed you will please find copy of a letter addressed by us to the Hon. William Windom, Secretary of the Treasury, regarding the refusal of the Collector of this port to grant a clearance to our steamship Newport, to which we desire to call the attention of the representative body over which you preside. * * * We claim that the interpretation given to the United States laws by the officers administering the law division of the Custom House (seventh division) is, to say the least, an unfair one, as we cannot believe that it was the intention of any government or legislature to make the innocent suffer for the guilty; further than this, these officers decline to prosecute the men caught in the act of smuggling, but claim the right of holding the ship and her master for the offense, when the written report of the officers making one seizure stated that the cigars were found on the person of some of the crew who were attempting to land them—thus they desire to make our captains and officers revenue officers without pay, and our ship virtually bondsmen for them.

Even in Great Britain, where the laws on smuggling are very severe, the government does not pretend to hold the ship for smuggled goods which may be found on board, but if they discover the owner they punish him to the full extent of the law.

If you decide to accede to our request, we shall be pleased to appear before such committee as you may decide to refer the matter to, and place the subject before them in all



ALTERATIONS TO THE CROSS-HEAD OF A CORLISS ENGINE.—SIDE VIEW.

popular by Mr. Corliss in his engines, that the customary form of cross head is, in general terms, a spade handle, provided at one end with a fixed pin for receiving one end of the connecting rod and at the other with threads to receive the piston rod—the connection to each slide, or gib, being through a single large set-screw, arranged vertically in the body of the cross-head, behind the pin, and at some distance therefrom, so as to give ample room for the removal of the connecting-rod strap and brasses. That is, the vertical thrust of the connecting rod is not carried through the slides to the guides, directly under and above the cross-head pin, as it should be, but at a point so far behind the cross-head pin as to practically make the cross-head and piston rod a lever, with the set-screws as a fulcrum, operating to lift the

its details. Anticipating your thanks, we remain, sir, your obedient servants,

JAMES E. WARD & Co.

The circumstances of the hardships here related appear but in part from the above communication. The gravamen of the charge against the New York Collector, otherwise the Treasury Department, is that the steamship owners are made liable for the misdeeds of anybody who happens to be on board of their vessels, rather than the criminals themselves. The perpetrators may go scot free, while persons who regard themselves wholly innocent are the ones to suffer. Messrs. Alexandre & Sons' line to Havana had an adventure recently which is precisely in point. Unbeknown to the agents, somebody had removed a portion of the light pine woodwork behind a mirror for the purpose of concealing cigars. As

*Read before Society of Mech. Engineers.

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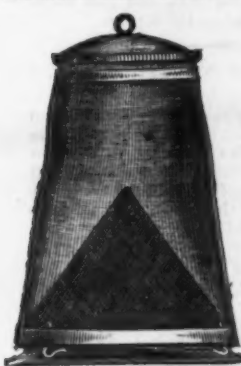
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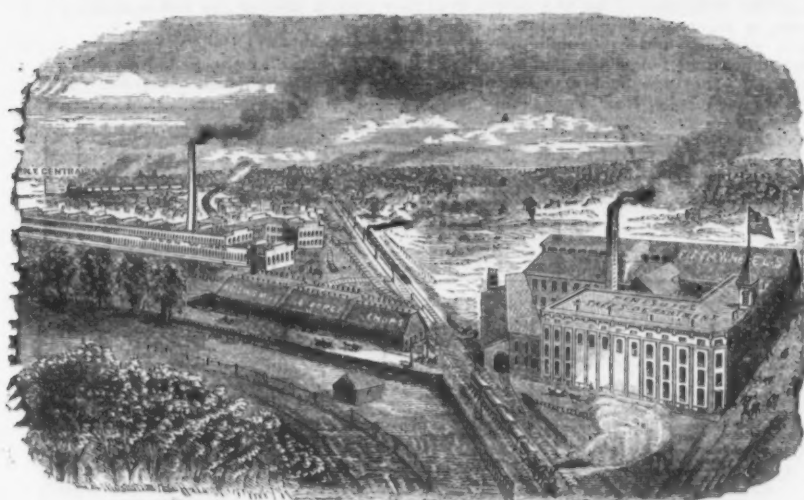
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Mill Blunt,
Mill Pointing,
Pillar,
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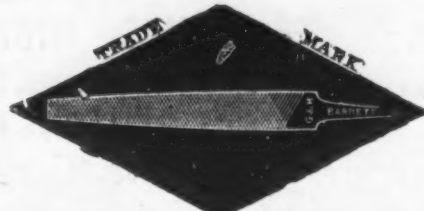
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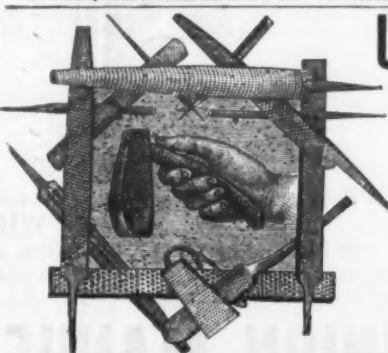
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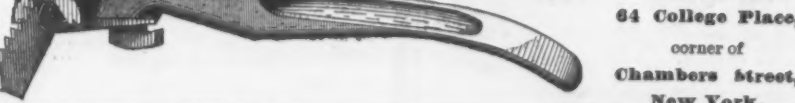
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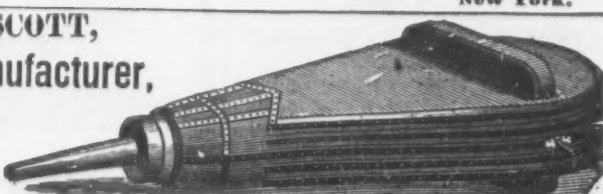


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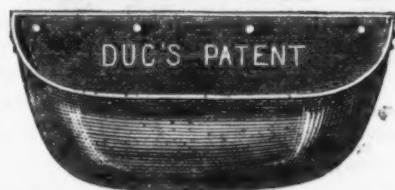
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The Storehouse Bucket, in sizes from 12 to 17 inches.

This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 200,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

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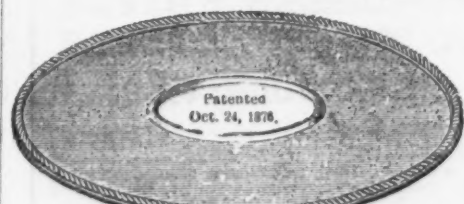


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THE ANSONIA CORRUGATED STOVE PLATFORM.

With Patented O. G. Border.



Out Showing Round Platform.

ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring
no nailing or lining, the edge retaining its
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Price as low as any.

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PURE ELECTRIC WIRE,

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For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Splittorf's patented Liquid Insulation, covered with cotton or silk.

All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,

For Clocks, Indicators, Telephones, Call Bells, Bell Punches, Steamboat and
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ESSEX HORSE NAILS.

Hot Forged, Warranted Best Quality, Pointed and Polished.

HOWE & CO., Troy, N. Y. Sole Agents.

appeared afterward, when the steamer was seized by a revenue officer, the parcels hidden therein were usually trivial in amount; but at last, when the receptacle was well stuffed, the officers saw their opportunity to impose a heavy fine. Vainly did the owners remonstrate; in vain did they appeal to Washington. "If you knew that all this was going on," said the latter, "why did you not let us know?" "Oh!" replied the officer, "it was not the men we wanted, but the steamer." Seizures and fines after this fashion, so we are told, are of frequent occurrence.

A question which interests American ship owners very much, and incidentally all who have goods on shipboard liable to detention, is this: How is it that so little of the annoyance and loss here complained of is experienced by European steamers, where, it is reasonable to suppose, instances of smuggling are much more frequent? "Special Treasury agents," says one, "are a queer sort of folk." Unjustly or otherwise, they are more than suspected of sometimes arranging "this little difficulty" by methods best known to themselves. In any case, all questions of justice and fairness aside, we may ask with some pertinence whether it is wise or politic to harass our American steamship lines—what few there are of them—by an arbitrary enforcement of Treasury orders, especially as it does not yet appear to be possible for steamship owners or agents to keep all their employees under such close surveillance as to protect themselves from smuggling devices.

The National Association of Stove Manufacturers.

The National Association of Stove Manufacturers met at Niagara Falls, on the 8th and 9th of June. The attendance was large and the proceedings harmonious. The most important action of the meeting was that on the report of the Committee on Business, which was as follows:

MR. PRESIDENT AND GENTLEMEN: The committees appointed to consider the several topics suggested in the address of our president, and to prepare such other business as may be found necessary to present, respectfully report:

That the general subjects of interest to the trade were very fully considered and discussed at the meeting in February last, and that subsequent events have, in the main, confirmed the positions then taken, and the decisions then made.

The unusual activity in business which existed at that time, has not only continued but largely increased, and there is every prospect of a still greater increase. Never in the history of our country have all the elements appeared to be so favorable to continued prosperity as in the present. The basis of this prosperity is to be found in the products of the soil, and we have reason to believe that in volume, the present year will not fall behind the great prolific years of the past.

With unexampled rapidity, enterprise is pushing the great civilization of the age into the remotest corners of our land, and the lines are rapidly followed by crowds with able and willing hands, planting villages and enlarging the area of our agriculture.

At our last meeting it was predicted that during the present year not less than 75,000 families would be added to our population, and thus be one active consumers of our domestic manufactures. Subsequent events indicate that the number of families thus added will approximate 125,000—a percentage of increase unparalleled in the history of the world.

The present large consumption of iron is another evidence of our general prosperity. This consumption appears to be limited only by the amount of machinery adapted to its manipulation. It has, therefore, been generally believed that the price of pig iron could not long remain so near the cost of its production. The results have shown the uncertainty of business judgment. Instead of "a strong iron market with a tendency upward," as was considered probable, we have had a weak market with a tendency downward. We have failed to appreciate the tremendous capacity for production, both at home and abroad, and also the vast amount of scrap iron that has been crowded upon us from every quarter of the globe.

The statements made by the producers of pig iron are pretty uniform, that lower prices than those now current must result in the blowing out of a large number of furnaces, and we are told that this process has already commenced, and if continued the price of American iron must soon advance.

The great industry like that of the manufacture of pig iron cannot go on indefinitely at a loss, or even at no profit.

Manufacturers, whose word is credited, assert that there was more encouragement to continue in past years, with the price at \$17, than there is now with the price at \$24 or \$25, and this is due to the increased cost of labor and fuel.

There is much cheap iron upon the market that is not adapted to the manufacture of stoves. The use of it would be unprofitable to both makers and users of these indispensable articles of furniture, and we believe that it is not safe to estimate the cost of good No. 1 stove-plate iron below \$24 or \$25 during the present season.

We think it is fair to say that the price of iron is \$1 to \$2 per ton lower than at the time of our February meeting, and it is an anomaly, in view of the largely increased cost of labor, and of most other items that enter into the consumption of all kinds of manufactures. A careful investigation of this subject by your committee has satisfied them that, notwithstanding the small reduction in the price of iron, the cost of producing stoves has increased over \$5 per ton since our last meeting. It is, therefore, our opinion that firmness in the prices of our products can only insure a satisfactory balance sheet at the end of the year. It cannot be doubted that many balance sheets were not satisfactory at the close of the past year, nor that so complicated a business as ours is fairly entitled to more just returns.

A successful stove manufacturer must possess a rare combination of gifts. He must have taste, ingenuity and mechanical skill, executive and mechanical ability, good

judgment, system and promptness, and, beyond all, a large capital in proportion to the amount of business done, as well as good credit.

It would, therefore, appear to your committee that sensible men thus armed would be unwilling to continue in the business year after year with little or no profit. No one conversant with the business can doubt that hundreds of thousands of stoves are sold by manufacturers every year far below the cost of production. We believe that this course is unnecessary, and we know that it is discreditable to the trade.

It cannot for a moment be doubted, that the stock of stoves now in the hands of both manufacturers and dealers are lighter than usual at this season of the year, nor that the power of production by reason of labor troubles is also less. It is also very evident that none of the elements are lacking which conspire to a large demand for our goods during the remainder of the season. It would, therefore, appear to be the part of wisdom that we do not urge their sale at summer prices, during the early summer months before the demand really commences, as has been too much the custom of the trade in the past. The unpleasant experience in 1880, in this particular, should not pass unheeded.

Upon a full consideration of the points urged by your committee, they respectfully recommend that 5 per cent. be added to the February price of stoves, and that the rates for hollow ware and repairs remain as at that time, viz: 50 per cent. discount on ware and 8 cents per pound for repairs. Respectfully submitted.

JOHN S. PERRY,
W. H. TEFIT,
G. F. FILLEY,
U. HILL, JR.,
W. H. WHITEHEAD.

This report, which was discussed by sections, was finally adopted without amendment.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The glass factory at South Lyndeborough has stopped for repairs. They are enlarging the pot molds, so that the pots will hold about 3 pounds more of glass than the old ones. The whole four pots will make about 85 gross of bottles per day.

MASSACHUSETTS.

The American Tube Works are adding to their establishment at Somerville by the erection of a brick monitor-roof structure.

New York parties are negotiating for the Novelty Works, on Court street, Taunton. The building—a large one—is about all there is left of the establishment, nearly all of the machinery having been sold some time ago.

The Wiley & Russell Manufacturing Company, of Greenfield, are extensively repairing the old cutlery shops, whither they moved some months since, to give more room for their business.

The Lockwood Manufacturing Company, of East Boston, have just put in a 48-inch Harrington lathe, and have ordered an 8-foot Niles boring mill, a 60-inch lathe, a 60-inch planer and several other large tools from the machinery house of Hill, Clarke & Co.

The stockholders of the Fairport Plating Works, of New Bedford, have decided to erect another factory with a capacity equal to the present one. The new building will be of brick, and will stand between Front street and the present building, to which it will be joined. The present quarters are so crowded that a wooden building will be erected immediately, which will be occupied until the new brick building is completed.

CONNECTICUT.

The Hartford Engineering Company have begun the manufacture of the Medart steel rimmed pulley, about 100 having been already finished to order. Among them is one of 72 inches diameter by 20 inches face with double arms, to accompany the engine built by the company for the Billings & Spencer Company.

The Cowman Manufacturing Company have contracted with the Colt's Fire Arms Company, of Hartford, for the manufacture of the Cowman cigarette machine. The first machines are to be ready early in July, and others as soon as possible. The rental has been definitely fixed at 33 cents per 1000 cigarettes. The machines will be placed in factories and kept in running order at the company's expense.

PENNSYLVANIA.

The Philadelphia Smelting Company have again found it necessary to increase their foundry facilities, and are enlarging their establishment on Twelfth street to about double its present size. They are now receiving orders for deoxidized bronze rolls for paper machinery, and are working on contracts from some of the leading concerns in the country. They are also very busy on church work, gas fixtures and other ornamental brass work.

Tinius Olsen & Co., Philadelphia, are busy on general machine work, and are also building two air engines of a new design. Orders for their testing machines are also quite numerous. They have just delivered an improved spring tester for use in Chas. Pickering & Co.'s Car Spring Works. They have a similar machine under way for the Pompton Iron and Steel Company, and a number of charging scales for different parties in Pennsylvania.

C. W. & H. W. Middleton, of Philadelphia, have recently received quite a large order for railway fastenings from Japan. They have already made one shipment to the value of about \$3000.

It always affords us pleasure to chronicle the substantial success of our friends, and we, therefore, take occasion to congratulate the live, energetic and pushing firm of Messrs. Creveling, Miles & Co., upon the extension of their business during the past few years. This is now one of the leading iron firms in this section of the State, as their increased prosperity fully demonstrates. We have been informed that they are now turning out more finished rails, in proportion to their capacity, than any other rolling mill in Pennsylvania.—*Danville (Pa.) Record.*

The new Whitwell hot-blast stoves which have been in process of erection at the Spear

Cutlery.

FRIEDMANN & LAUTERJUNG,



Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.



And the celebrated "ELECTRIC SHEARS." Nickel Plated Bows.

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Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.

OUR BUTCHERS' and HUNTERS' KNIVES

Are warranted to be equal in style, finish and quality, to any goods made in the world.

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We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and the manufacture of fine carvers is with us a specialty.

AARON BURKINSHAW, Pepperell, Mass.,

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PRUNING, BUDDING AND POCKET KNIVES

OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted. Established 1853.

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In all Styles.

J. R. TORREY RAZOR CO.,

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RAZORS.

To introduce we offer Hollow Ground Razors at \$1.50, \$2.75, \$3; Ivory, \$2.50. Our Swedish Gem Razors, \$2.75, \$3, \$3.50; Ivory, \$3. All our own make, and warranted the best cutters in the world. As razor makers we know what is needed to sharpen a dull razor and will mail for 75 cts. a Strop warranted to set a fine edge to any razor. If in Morocco case, \$1. Factories at WORCESTER, MASS. Send for Catalogues.

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IMPORTERS, MANUFACTURERS' AGENTS

AND WHOLESALE DEALERS IN

CUTLERY,

HAVE BOUGHT OF

JOHN RUSSELL CUTLERY CO.,

who have now ceased carrying stock in New York, the entire stock, comprising the full assortment of

TABLE CUTLERY,

Butchers', Hunters', Painters', Druggists' and Household Knives,



POCKET KNIVES,

Plated Ware,



which they have hitherto carried in New York. Included in this purchase are Many Specialties and various items which we can sell at

SPECIAL * & ATTRACTIVE PRICES.

We shall in the future, as heretofore, be always prepared to fill orders at Manufacturers' Prices for all of John Russell Cutlery Co.'s Goods, as well as for all descriptions of

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WE INVITE THE ORDERS OF THE TRADE

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THE LEADING WRINGER OF AMERICA.

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Office and Factory, CINCINNATI, OHIO.

THE

PEERLESS

CLOTHES WRINGERS.

Sold by the Jobbing Trade everywhere. Most Saleable Wringer in the market.

MR. L. F. BLUE, who has been in our employ for a great many years, is our SOLE AGENT, and will visit the jobbing trade throughout the United States.

THE COMBINATION

IRON CLAD STEEL HORSE SHOE CO.,

SELF WELDING STEEL TIRE CO.,

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Sole and exclusive manufacturers of "Wheeler's Combination" Shoes, Shoe Bars and Toe Calks. Tire and Wire. Full particulars upon application by mail or otherwise to WARE H. GAY, Treasurer, 60 State Street, Boston, Mass. All persons cautioned against infringements.

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ALFRED H. HILDICK,

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BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.

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The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

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Alfred Field & Co.,

COMMISSION MERCHANTS,

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Guns and Pocket Cutlery.

SPECIALTIES.

Headquarters for

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WILSON'S BUTCHER KNIVES, &c.

WOSTENHOLM'S POCKET CUTLERY AND RAZORS,

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FOUR PEPPERCORNS AND A DIAMOND.

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None genuine unless stamped

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Popular Wrenches.

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SCREW WINDOW BALANCE

With which the Sashes work as

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We guarantee these goods to be solid and of uniform quality throughout, with no coatings to wear through or flake off, and with no liability to rust.

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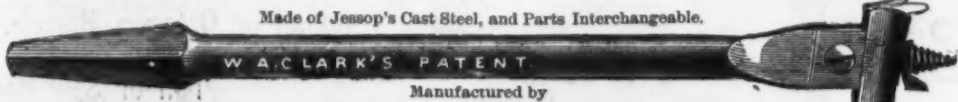
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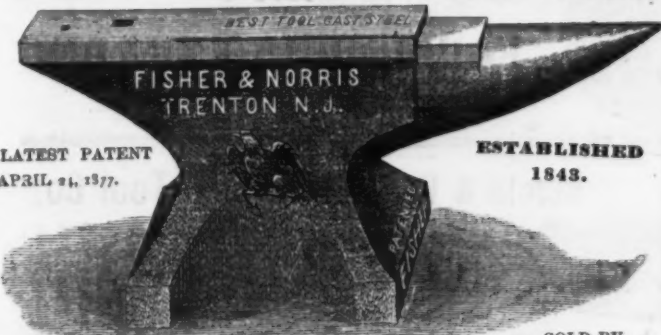


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Better than the Best English Anvil.



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Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

N. B.—That the "Eagle" Anvil is the only one made at Trenton, New Jersey, and it must not be mistaken for an Anvil in the market called Trenton, but which is really of foreign manufacture, and an imported imitation of the English Anvil.

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man Furnaces, at Sharpville, for some time past have been completed and are now in full and successful operation. Everything worked together most satisfactorily from the moment the blast was turned on, and has continued to give as complete satisfaction since. Mr. Spearman expresses himself as highly pleased, both with the manner in which the works were constructed and their workings since being put into operation. This very satisfactory condition of affairs is largely due to the careful workmanship used in the construction of the stoves. The brickwork was laid by Witherow & Gordon, of New Castle, the general agents for these stoves. The wrought-iron work was done by Gemmil & Hawthorne, and the cast-iron work by Geddes & Eagan, of Sharpville.

A boiler exploded in Atkins & Bros. Fish-back Mill, near Pottsville, about noon on the 10th inst. Twelve men were badly scalded, three of them being fatally injured. The cause of the explosion was leakage.

The Newmyer Brothers have just finished 19 new coke ovens at their works on the Hickman Run Branch, Connellsville Region. This makes 44 ovens in all.

The coal product of the Schuylkill region for the week ending June 4, was 172,767 tons, as against 108,509 tons for the week previous, and 100,233 tons for the corresponding week of last year. The total product for the week was 614,051 tons, against 369,334 tons for the same week of last year—an increase of 144,717 tons. The output for the year so far is 10,537,154 tons, against 8,744,255 tons for the corresponding period of last year—an increase of 1,792,899 tons.

The Charlotte Furnace, Scottdale, is running full blast now. Mr. G. H. Everson is giving the mill a thorough overhauling and repairing.

One of the three large cotton presses contracted for at the Scott foundry, Reading, has been finished, and its shipment was commenced this morning, when the large cylinder and some other portions were sent away. Considerable progress has been made on the second one, and some of the castings have also been made for the third one.

There were cut at the nail factory of the E. & G. Brooke Iron Company, Birdsboro, during the month of May, 16,217 kegs of nails and spikes. In the same month 14,706 kegs were shipped from the establishment to different parts of the United States. The puddle bar product for May was also quite large, but somewhat less than other months on account of the puddlers being obliged to discontinue work several times in the warm weather.

The furnace located at Eastport, on the Reading Railroad, went out of blast last Monday week.

Messrs. Heizmann, proprietors of the Penn Hardware Company, Reading, are about to erect additional works for the manufacture of their regular goods. The new buildings will occupy an entire block of about three acres in extent. There will be four foundry buildings, each 60 x 100 feet in size, which gives them 24,000 square feet for the molding department. The machine shop will be 30 x 100 feet, and the china house and japanning department each 30 x 50 feet. The above buildings will be all one-story in height. The finishing shop will be 40 x 300 feet in size, three stories high, and will include the offices, packing room, stock room, &c. The engine room will adjoin the machine shop, and the boiler house will be north of the engine room. The carpenter shop will be 30 x 50 feet. The new works, with the old ones, will give employment to about 650 hands. The number at present is 150.

The Cleveland Rolling Mill Company are pushing the work on their new coke ovens at the Moyer Works, Connellsville district. They have concluded to erect 250 additional ovens. Fifty of these are already completed, being built in the short space of one month. Work on the others is being pushed with a corresponding vigor. When the whole are completed this firm will have 360 ovens at Moyer, making it one of the most extensive works in the region. The firm are putting in place a new engine, which will do the double duty of hauling the cars out of the pit and running the laries over the ovens.

The Columbia Furnaces, at Danville, were not in operation during the month of May, but went into blast at the beginning of June. Wood is being placed in the stack of No. 2 blast furnace of the E. & G. Brooke Iron Company. As soon as the work of filling is completed the furnace will be put into operation. The railway for the cinder cars is also being put in order and other necessary work performed.

The rise in the value of timber and mineral lands in Center County is simply enormous. Jamison, the Philadelphia banker, has, with a syndicate, invested \$1,000,000 there. Mercer, the Boston capitalist, has purchased mining lands to the extent of \$1,200,000. The Carnegies, of Pittsburgh, have also invested in this neighborhood. The Pennsylvania Railroad Company has purchased all the railroads and invested large sums in mining land—it is said \$2,000,000. The Cambria Iron Company recently paid \$73,000 cash for the lease of 300 acres of brown hematite ores for 12 years. Except among the bullion mines, we do not believe that there is such a county in the United States. There will soon be no mineral lands to be had in that county.—Lehigh Journal.

Zehn & Brother, Kutztown, machinists, are now employing 18 hands, who work daily from 6 a. m. to 6 p. m. They finished their fifth engine last week of the number ordered since the spring business opened.

At the Stewart Iron Co.'s works at Sharon, the bloom mill was on all last week, six heats a day, and can't get any blooms ahead. Both blast furnaces are working up to average.

The Montour Iron and Steel Works made, in the month of May, 328 tons of rails. The blast furnaces of this company are not at present in operation.

Yeager, Boyer & Co., of Reading, are erecting the 70-horse-power duplex boilers for Orr, Painter & Co.'s stove works, and have finished the 70-horse-power duplex boilers for the Mount Penn Stove Works.

The Western Iron Company's blast furnaces are both in blast and doing well.

Sternberg's new rolling mill, at Reading, is being rapidly pushed forward. About a dozen men are at work, and the foundations

have already been laid for the rolls. The mill will be completed in about two months.

Danville Furnace No. 1 made during the month of May 574 tons of pig metal. It is to be hoped that Gen. Painter will soon start the large No. 2 Furnace.

The stove foundry being erected along the Lebanon Valley Railroad, Reading, by Stauffer & Co., is nearing completion. Workmen are at present engaged putting the building under roof, and will have the shop in working order as soon as possible.

The entire property of the old Lehigh Zinc Company, with the exception of a few lots in South Bethlehem, has been purchased by Messrs. R. & C. A. Heckscher, wealthy coal operators in the Schuylkill region. It was mentioned in these columns a few days ago that Mr. J. T. Lewis and other capitalists, of Philadelphia, were about purchasing or leasing the property. Mr. Lewis made several visits to Bethlehem with a view to the purchase, but it appears that himself and colleagues could not come to terms with the late owners. The Messrs. Heckscher, the new owners, have ample means, and will no doubt run the works successfully. The oxide department will be put in blast as soon as the necessary repairs can be made, and will be operated to its full capacity. The ore will not be brought from Virginia, as proposed by Mr. Lewis, had he got control of the works, but will be shipped to the works from rich and extensive mines in New Jersey. A number of spiegelisen furnaces will be built and operated, and it is proposed to run the spelter works and zinc rolling mill in the near future. We understand that a large number of the old employees will be retained. The Messrs. Heckscher reside at Mahanoy City.—Bethlehem Times.

PITTSBURGH AND VICINITY.

A large proportion of the Pittsburgh iron works were compelled to shut down last week, on account of the very high water in the Allegheny and Monongahela rivers. Among them were the Clinton Mill, Oliver Bros. & Phillips' plate mill, the Standard Nut Company, Dilworth, Porter & Co., Brown & Co., and all the mills and furnaces along the Allegheny River above Eleventh street. Very much damage was done by the water and the loss will be heavy.

All the departments of the Elia Iron Works have suspended operations, owing to a break in the gas mains which supply the fuel to the furnaces. Men are now examining the line for the purpose of finding the location of the break. As soon as the repairs can be made operations will be resumed.

Notice has been given that the Crescent Tube Company, Limited, has been dissolved, and John D. Scully, Henry P. Ford and Jas. I. Bennett elected liquidating trustees, with power to wind up the business.

About 8,000,000 bushels of coal will go out on the present rise in the rivers.

The Lucy Furnaces have passed into the hands of a new company, styled the Lucy Furnace Company, Limited, and composed of Wilson, Walker & Co. and Carnegie Bros. & Co. The capital of the new company, of which Mr. Wilson is chairman and Mr. Walker secretary and treasurer, is \$1,000,000.

OHIO.

The Jefferson Iron Works, at Steubenville, was compelled to shut down on account of the high water in the Ohio.

Alice Furnace, at Ironton, was stopped and banked up Saturday night. The furnace will remain idle a week or ten days, to await an accumulation of stock and make some repairs.

Hall's safe and Lock Company, Cincinnati, now employ more than 600 workmen, and others are wanted. Orders for Hall's safes and locks were never so large and pressing as at the present time.

B. F. Mercer, Alliance, has enlarged his pump works nearly double, and thus far this year has sold beyond his entire product of last year.

The Globe Rolling Mill No. 2, Cincinnati, is about to engage largely in the manufacture of hoop iron.

A movement is on foot among capitalists to erect in Cincinnati a mammoth watch works factory.

Udall & Niles, founders and machinists, Niles, report trade good. Their specialties are plow points and saw mills. They do general repairing and jobbing on short notice.

The Canton Cutlery Company are manufacturing a very large line of pocket cutlery. Two hundred men are at work, and yet difficulty is had in filling orders.

A carriage bolt manufactory and a woolen manufactory will shortly be started at Ash-tabula.

The Akron Cutlery works are full of orders.

ILLINOIS.

The zinc manufacturers of La Salle find it to their interest to buy coal screenings in Chicago and have it delivered by the canal.

H. A. Streeter, proprietor of the Globe Iron Works, Chicago, is constructing the iron sheds for the new freight houses of the Chicago, Burlington and Quincy Railroad Company. He is also furnishing the ironwork on the Court Houses at Ottawa and Shelbyville.

Dispatches from Chicago state that a bill has been filed in the Circuit Court there by Jerome T. Case against the Joliet Iron and Steel Company and others, including the Central Trust Company of New York, praying for the appointment of a receiver. The complainant owns 149,000 shares of stock in the concern, and alleges that all property of the Joliet Iron and Steel Company has been appropriated by Alexander J. Leith for his private benefit.

The Preble Machine Works, of Chicago, are rushed with business. They are making large quantities of wood-working machinery, and are keeping a force of 23 men at work overtime.

The Chicago Die and Machine Works have recently ordered a large quantity of new machinery, which will double their present capacity.

The Gillespie Foundry was burned to the ground last Thursday night. The foundry contained molds, flasks, a melting cupola, engine, blower and other machinery and apparatus, on which, with the building,

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

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SARANAC HORSE NAILS,

Blued or Polished.

Terms, Cash, within 60 Days.

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HARTLEY & GRAHAM, 17 & 19 Maiden Lane, NEW YORK,

Agents for the "ROBIN HOOD" REVOLVERS.

STEEL BARREL AND CYLINDER.

22, 32, 38 and 41 CALIBRE.

Cal., Short or Long Cylinder.

Wood, Rubber, Ivory and Pearl Handles.

Plain or Fluted Cylinders.

Round or Octagon Barrels.

Plain Finish, Engraved or Enameled.

FOR JOBBING TRADE.



ROBIN HOOD No. 1, 22 Cal.

32 Cal. Long Fluted Cylinder.

Wood, Rubber, Ivory or Pearl Handles.

Round or Octagon Barrels.

Plain or Saw Handle.

Plain Finish, Engraved or Enameled.

FOR JOBBING TRADE.

MARLIN REPEATING RIFLE.



LATEST AND BEST.

MANUFACTURED BY

MARLIN FIRE ARMS COMPANY, New Haven, Conn.,

Makers of the Celebrated BALLARD RIFLES.

Mr. C. Goss, Denver, Col., writes: "It is the best Magazine Rifle I have ever seen."

Made in two sizes, 40 cal., 60 grains powder 280 grains lead; 45 cal., using government cartridge. Send for descriptive list.

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Established 1837.

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HANDCUFFS AND LANTERNS.
141 to 145 Railroad Avenue, NEWARK, N. J.
Illustrated Catalogue sent to the trade on application.

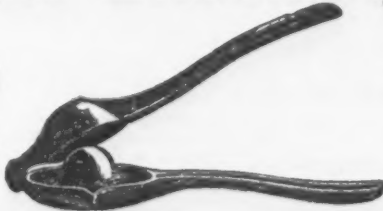
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All kinds Wagon & Carriage Axles
Manufactured by the
LAMBERTVILLE IRON WORKS.
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Send for prices.

The Boss Lemon Squeezer.

Malleable Iron and

Tinned (pure Tin).



Acknowledged the Best.

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CHAMPION
HOG RINGER
RINGS and HOLDER.

Only double Ringever
invented. The only
Ring that will effectually
keep Hogs from
rooting. No sharp
points in the nose.

Rings, 75c. Rings, 50c. to 10c. Holders, 75c. Huskers, 75c.

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EAGLE BILL
CORN HUSKER
is the best Husker in the
market. Farmers say it
is the best. Use no other.



BROWN'S
HOG AND PIG
RINGER and RINGS.
Only single Ring in
the market that closes
on the outside of the
nose. No sharp points
in the nose to keep it
out.



Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal.

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HARDWARE MANUFACTURERS' AGENTS,

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Brooks' "Boss" Scythe Rifles. Miles Alarm Till Co.
Burden's and Perkins' Horse and Mule Shoes.
Ausable Chasms, and other Leading Brands of Horse Nails.
Kerr Brothers & Co., Fork, Shovel, Spade, Rake and Hoe Handles.

THE BUTLER DOOR AND GATE SPRING.

Adjustable, Reversible, Self-locking. Has no Loose Piece. Needs no Wrench. Acknowledged the Simplest and Best Made.

BUTLER DOOR SPRING CO., Cleveland, Ohio.
HORACE F. SISE, 100 Chambers St., New York Agents.
BROWER & LEEDS, 81 Murray St.,

THE "BOSS" SCYTHE RIFLE.

Warranted not to scale or glaze. Impervious to water, and not affected by heat. It is the best Rifle now offered.
LEVI L. BROOKS, Manufacturer,
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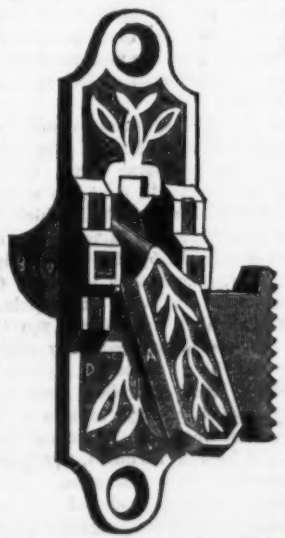
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O. Ames & Son's Shovels, Spades and Scoops. A. Field & Son's Tacks, Brads, Nails, &c. Nicholson File Co.'s Files and Rasps. W. & S. Butcher's Chisels, Gouges, Plane Irons and Cleavers. E. W. Gilmore & Co.'s Strap and T Hinges. Russell Jennings' Auger and Dowel Bits. Also a general assortment of Hardware.

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Is attached to the sash easily, without in the least weakening or defacing it. No holes to be cut in casings, no attachments thereto, no abrasion no matter how long used, nor how severely. Is never out of order. Address

Universal Sash-Lock Co.,

8 W corner Hamilton and Liberty Streets, ALBANY, N. Y.

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Manufacturers of Calkers', Carpenters', Stone Cutters', Tin, Copper and Boiler Makers'

MALLETs,

Hawking Beeties, Hawking and Galling Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles, &c. Also

COTTON AND RALE HOOKS. Patented Feb. 13, 1877; a new combination of Hooks. 456 E. Houston St., New York City.

The Perfect Fit Dog Muzzle.



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PHOSPHOR-BRONZE.

the loss was about \$6000. The stock, consisting of pig iron and iron sash weights, was not injured.—Chicago Industrial World.

The Streater Bottle and Glass Company have been incorporated, with a capital of \$40,000, by Wm. W. Haskell, Hiram N. Ryder and W. J. Williams.

The Gates & Scoville Iron Works, of Chicago, have just received a second order from the Chicago (South Side) City Railway Company for a No. 3 crusher, to be used in crushing ballast for their new cable system.

The American Cutlery Company, whose works were partially burned last month, are placing in a quantity of new machinery, and have added another story to their works, which now occupy 175 x 140 feet, three stories and basement brick, and have increased their capacity one-third. It is expected that the works will be in full running order by July 1, and will furnish employment to 200 hands.

IOWA.

Morrison Bros., of Fort Madison, manufacturers of the Morrison walking cultivators, steel and wood beam plows, harrows and road scrapers, are building important additions to their works as follows: One-story building, 145 x 55, for foundry and blacksmith shop; two-story and basement building, 165 x 70, for machine shop, wood-working machinery and paint shop. They already have a building, 120 x 40, for blacksmith shop; one two-story building, 185 x 40, for wood shop and painting, and one warehouse, 145 x 50, and another 30 x 70; two stories, all brick and stone except the two latter.

MICHIGAN.

The blast furnace at Caseville, belonging to the Lake Huron Iron Co., is about starting in again, after a rest since November last. During this time the hearth and boshes have been rebuilt and a new hot-blast added, the old stoves having been burnt out. The company propose to make Bessemer iron for the Chicago market, but are uncertain about the length of the blast, owing to the scarcity of wood.

The Peninsular Car Works are turning out about 15 freight cars a day from the Detroit shops and eight a day from the Adrian shops. The erecting shop at the Detroit works is to be lengthened out by an addition of 100 feet.

The citizens of Big Rapids are trying to raise a bonus of \$2500 for the establishment of an ax factory in that city.

In consequence of the failure of the supply of hard ore from the Pioneer mine, one stack of the Pioneer furnace will be blown out or banked. The mine is apparently mined out.

Excelsior Furnace has blown out for repairs.

The Menominee Mining Company have decided to build a furnace at Florence and will commence work thereon at once.

KENTUCKY.

The Ashland Furnace completed the repairs occasioned by the recent accident to the engine and went into blast last Saturday morning. She is now working very well and making her usual output.

The Norton Iron Works are in full operation in every department, and the usual amount of work is being turned out.

The Hunnewell Furnace is receiving 23 loads of charcoal per day, and turning out an average of 17 tons of good iron.

The Pennsylvania Furnace is again in blast and is doing well.

We learn that the Norton Iron Works declared a dividend of 5 per cent. on its capital stock, payable June 1.

MISSOURI.

The Bowman Machine Company, of St. Louis, shipped eight wheat heaters to a single flouring mill in Oregon during the past week.

The Smith, Beggs & Ranken Machine Co., of St. Louis, have completed and shipped to destination a 300-horse power Corliss engine, which is to furnish the motive power of E. O. Stannard's flouring mill at Alton, Ill. The company are making an addition to their works at the intersection of Main and Monroe streets, the cost of which will be about \$4000. As soon as this is ready for occupancy they will largely increase their force of workmen.

The Grant Ore Pulverizer Mfg. Co., St. Louis, shipped one of their crushers to Rosita, Col., last week.

An Improvement in Hoop Mills.

It is a fact well known to the trade that one of the greatest difficulties in the manufacture of hoop iron is to produce it with good, smooth edges. Even when the iron is good and properly heated, and the rolls are new, with a proper reduction in the planishing and finishing rolls, it is scarcely possible to avoid the production of some ragged-edged hoop. And as the iron is not continually of a uniform quality, and it is almost impossible to keep the furnace at a uniform temperature, this, with the continual wear of the rolls, all tends to increase the percentage of ragged-edged hoop. When the cost of the pig metal, coal, ore, brick, clay, oil and labor in making the hoop iron is considered, it will be found that the ragged-edged hoop is not worth more than one-third of what it has cost, and it therefore becomes a very important matter in the economy of production to avoid making such defective material.

Pittsburgh has for many years been credited with making the best, toughest and handiest hoop iron in this country. This well-deserved reputation has been earned by the experience of many years of careful practice in the selection of stock, the education of workmen and the employment of improved machinery, and yet, with all these advantages, it is stated by good authority that the average production of ragged-edged hoop will not fall below 8 per cent., and often runs much higher.

Mr. John Gearing, a hoop roller of enlarged experience, who has for many years been in the employ of Messrs. S. Painter & Sons, at their hoop manufactory in Pittsburgh, has invented an improvement on the hoop mill by which the production of ragged hoop may be largely avoided, and from 98 to 99 per cent. of good, smooth-edged hoop pro-

duced. Mr. Gearing's improvement has been applied to the 8-inch hoop train which he has charge of at the works of S. Painter & Sons, and the following is the record of a week's work of six days of eight hours each, barrel hoop cut to length, 1 7-16 and 1 11-16 wide, 8 pounds to the set:

	Pounds.
Monday, May 9.....	26,317
Tuesday, May 10.....	26,374
Wednesday, May 11.....	25,954
Thursday, May 12.....	25,000
Friday, May 13.....	24,783
Saturday, May 14.....	19,409

Total..... 148,348

In this large output of 148,341 pounds there was but 1022 pounds of ragged edged and defective hoop of all kinds, which is less than 7-10 of one per cent.

During the following week even better work was accomplished, as will be seen by the record:

	Pounds.
Monday, May 16.....	24,475
Tuesday, May 17.....	27,410
Wednesday, May 18.....	23,579
Thursday, May 19.....	23,322
Friday, May 20.....	26,230
Saturday, May 21 (not working).....	

Total..... 129,988

This was oil barrel hoop cut to lengths, 8 pounds to the set.

	Pounds.
Good hoop shipped.....	129,566
Defective and ragged edge.....	422
Total.....	129,988

Which shows that 99.63 per cent. was good hoop and only 0.37 defective. This is certainly the best record of 1 7-16 and 1 11-16 Nos. 19 and 20 cut hoop ever made, and proves the value of the improved hoop mill beyond a question.

Gearing's improved hoop mill not only produces a greater percentage of good hoop, but it produces the hoops of the exact width desired. It is well known that by constant use the grooves in the rolls wear wider, so that they are often thrown away for scrap when the grooves have become too wide. While in other respects the rolls are desirable for much more work, it is stated that by the use of Gearing's improvement, double the tonnage may be rolled on a pair or set of rolls than can possibly be rolled on them without the improvement. It matters not how much the rolls are worn, nor how wide the hoop comes out of them, its edges are subsequently rolled so that the finished hoop is always of the exact width. The mill is useful in rolling hinge and lock iron, which requires to be straight and have perfectly smooth and square edges, because either round or square edges may be made at the will of the roller. It is said also to be of advantage in rolling band iron, pipe iron and nail plate.

We are indebted to Mr. Jacob Reese, of Pittsburgh, who is the representative of the patentee, for the details given. The improvement, which we shall describe in detail at an early date, is attached at a low cost to existing trains. We are informed that Messrs. Lindsey & McCutcheon, the well-known manufacturers of hoop, are now putting in the Gearing improvement.

LABOR AND WAGES.

The strike of the miners and cokers in the Connellsville coke region was not a success. Mr. Frick, of H. C. Frick & Co., stated that operations at his mines near Broadford were suspended for only one day, and that all the works owned by his firm are now running as usual. At many other works a majority of the strikers have resumed work, and at present there are only four mines in the entire region at which work is entirely suspended. Some of the miners say that the strike was projected by parties who were not authorized to demand an advance in wages, and hence the failure. The operators say this is the dull season, and that they will close their works rather than pay an advance. At the Morewood mines, near Mt. Pleasant, the strikers have been behaving badly, according to the statement of the operators, who say that they have flourished revolvers, and by menaces have intimidated the miners who desired to work.

A "Roll Hand" at Joliet gives the following to the Labor Tribune as their mode of work: "We commence to roll at 6 o'clock on Monday morning, and quit at 5 o'clock Saturday afternoon. We change rolls on Sunday, but none of the roll hands work but the catcher and the man who is sticking in for the roller."

The following are given as prices of labor at the rail mill, Cleveland, Ohio: The roller gets 9.2 cents; rougher-down, 6.2 cents; rougher-up, 5.7 cents; catcher, 5 cents; No. 1 hook, 4.7 cents; No. 2 and 3 hook, 3.7 cents; No. 4 hook, 3.2 cents; No. 5 hook, 3 cents; No. 6 hook, 2.5 cents; a six spell hands at \$2.30. The heater gets about \$5 per day, or 5 cents per ton—not more. The roll hands say they have had an advance of 5 per cent. since the 1st of April on this scale.

The contract between O'Neil & Co., near Pittsburgh, and the miners employed by them expired on the 1st inst. It will be remembered that this contract was entered into last summer, the miners agreeing to work at 3 cents per bushel in consideration of having steady work guaranteed for a year. The works have lost but little time and the men have continued working right straight along at 3 cents, while during a considerable portion of time the other miners all around them were receiving 3 1/2. It was a part of the contract that the firm should retain at each monthly pay 10 per cent. of each miner's wages until the end of the contract as a guarantee of good faith. The amounts thus retained will be paid out tomorrow, and in the aggregate they sum up over \$6000. Some of the men receive over \$100 from this source. This is about as good as money found to three-fourths of them, for as a class the miners always live fully up to their incomes. At the termination of the contract the firm voluntarily raised the price to 3 1/2 cents, and this will be adhered to during the remainder of the present "run."

The miners at Hanlon's Station, O., employed by the Keystone Coal Company, struck last week. The trouble grew out of an order issued by the company to the effect that a certain amount of slate and coal should not be removed. A large number of men are employed at these works.

The Iron Age

AND

Metallurgical Review.

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M. Leon Chotteau seems irrepresable. He is hardly headed off in one direction before he appears in another with all the vivacity of his race. Having failed to convince us of the advisability of a reciprocity that was all one-sided, he returned home, but he is with us again. His last effort is before 'Change at St. Louis, and if the telegraphic reports of his speech are correct, he and his nation have grown wonderfully liberal. He is reported as desiring "all manufacturers and producers generally in St. Louis and the States of Missouri and Illinois, who may desire to have their products submitted to the markets of France free of charges, to send samples to the office of the French consulate, affixing labels, with prices and address of producers, whence they will be forwarded at once to France under

"his supervision. These commodities will be admitted into France free of duty." Such generosity we can hardly understand. What is the ulterior purpose of this new move in the interest of reciprocity?

The Stephenson Centenary.

On the 9th of June, 1781, George Stephenson was born at Wylam, near Newcastle-upon-Tyne, the son of a poor miner. By ingenuity, mechanical skill, energy and business capacity, he rose from a humble station to an acknowledged position as one who has contributed much, and probably more than any other man, to the introduction and rapid development of railways. His work in connection with the first railway opened—the Stockton and Darlington Railroad—did much to dispel prejudice and create popular favor for the new mode of transportation. His feats as an engineer and a mechanic, his unwavering belief in the future of the locomotive, and his ready command of means for overcoming difficulties, triumphed over the ignorance and the hesitation of the great majority of even the best informed of his time. He built his first engine in 1814, and in the following years considerably improved its construction, until in 1829 he was successful in a competition for the Stockton and Darlington Railway, which was formally opened to traffic in September, 1830. After the accident which occurred on that memorable day, Stephenson showed, by making 15 miles in 25 minutes, what the "iron horse" was capable of accomplishing, and with the news of the fatal accident on the first day in which the first railway was used by the public, the statement of its wonderful achievement went before the world. Stephenson has been justly regarded by his contemporaries and by succeeding generations as a great and a good man, and the tribute paid to his memory in England is well merited. But it has become customary of late, not alone in England, but in this country, to single him out as the hero of the invention and introduction of the locomotive. While doing full justice to his merits and giving him ample credit for the work he has accomplished, it is not fair to allow admiration for him to blind the public to the achievements of others. There is naturally a tendency to associate a great thing with one name only, as after a series of years minor contributors are forgotten, and generally the part taken by one person is so overwhelmingly prominent that no serious injustice is done.

Stephenson has been, without any effort of his own, elevated to that position in connection with the modern railroad, and yet he was neither the originator of the idea to propel freight and passengers on a track by means of a "traveling engine," nor was he the first to devise the machinery for that purpose. His admirers cannot even claim for him that he was the first to achieve success, because others before him had built locomotives and operated a railroad on a working scale. Road engines and steam carriages had been tried by a number of ingenious mechanics for a number of years, and tramways for horses had been introduced as early as the middle of the seventeenth century in the Hartz Mountains, and later in English coal mines. The first man, however, who proposed to convey freight cars and passenger coaches on a track with the aid of a locomotive, was Oliver Evans, an ingenious mechanic, born at Newport, Del., who spent the greater part of his life in ceaseless labors at Philadelphia. How clear an idea Evans had of the future of the railway, will be seen from the following words: "The present generation," said he, "will use canals; the next will use railroads with horses; but their more enlightened successors will employ my steam carriages on railroads as the perfection of the art of conveyance. In the meantime, the steam carriages may be tested even on the present turnpikes. The time will come when people will travel in stages moved by steam engines from one city to another almost as fast as birds fly. To accomplish this, two sets of railways will be laid, traveled by night as well as by day, and the passengers will sleep in these stages as comfortably as they now do in steam stage boats." In 1809 he proposed to build a passenger railroad between New York and Philadelphia, laying a "track so nearly level" as not to deviate in any place more than "2 degrees from a horizontal line, made of wood or iron on smooth parks of broken stones or gravel, with a rail to guide the carriages, so that they may pass each other in different directions and travel by night as well as day." It has been claimed for Evans that a curious machine built by him in 1804, called the "Orukter Amphibolis," was the first locomotive. It is difficult to understand, after a contemplation of the drawings of that land and water engine, how this claim can be consistently advanced. From all the evidence now at hand, it seems that Richard Trevithick, a native of Redruth, Cornwall, was the first, in 1804, to build a successful locomotive engine. It has been charged that Trevithick obtained his ideas from an examination of the plans sent over by Evans to England. However true or false that charge may be, there can be no doubt that Trevithick was the first to build and operate a locomotive. In 1813 William Hedley put an engine at work, and in the following year Stephenson built his first locomotive at Killingworth, England.

It will be seen, therefore, that at least three men, Evans, Trevithick and Hedley are entitled, by reason of priority, to a share of the laurels which, by something like a corruption of public judgment, are in danger of being heaped exclusively upon Stephenson. However great his merits may be; however much his energy, ingenuity and ability may claim admiration, it is only just to those who labored as assiduously and as well as he, that their part in bringing the application of steam to the conveyance of freight and passengers on a railway, should be understood and appreciated.

Protection vs. Retaliation.

The English advocates of free trade and their echoes on this side of the water have always manifested the utmost concern for the welfare of the agriculturist of this country. Years ago, so long ago that it is history, the farmers of the West and the planters of the South were furnished with argument from England as to the terrible burden they were forced to bear, because of the unjust and unequal system of protective duties that were levied, and a picture of the utter ruin that was just before them, because of this protection, was painted in the most doleful colors. But somehow, notwithstanding this terrible protection, these farmers and planters were not ruined. The cotton fields have extended, the corn and wheat crops have grown with each year, until now the valley of the West is the granary of the world, and from the cotton bolls of the South comes the fabric that clothes the nations. But still our English friends cannot forget the idea that according to all "broad principles" this country should be ruined and our farmers impoverished; and so last year Mr. Augustus Montgredien set himself to work to tell the Western farmer that he was ruined; that though his crops might be excellent and his farm and stock all paid for, with money in the bank, political economy said he was ruined, and it was only "Yankee cussedness" that prevented his utter destruction.

But having failed to wheedle, they begin to threaten. Seeing the American system not only taking greater hold of our people, but extending to many of the European nations, they talk of retaliation. In a word, they are proposing to do what they can to fulfill their own prophecy. If the fates are against them, then they will detract the fates and set up as fates themselves.

We have already referred to the significance of the Preston election in England and the agitation among the workmen for some form of protection. Readers of English journals, and even of the telegraphic columns of our own press, cannot have failed to notice the extreme sensibility of the English people in regard to the new French treaty of commerce which is now in course of negotiation. The French workingman, who is back of the movement for this treaty, demands greater protection, and the government cannot be unmindful of the fact that it was the negotiation of the last treaty with England that began the downfall of the empire. A republic which depends so largely on the workingmen for its strength, must be mindful of their demands. In Germany, even Prince Bismarck yields to the demand for increased duties, and not only speaks for protection, but institutes methods to bring the free cities into the Customs Union. All of this is unpleasant news to England and the English workman, as it means a still further reduction of his limits of trade; and as he sees that in countries which have adopted protection labor is better paid, or, at least, if not better paid, is in better condition, happier and more contented, he asks why protection is not as good for him as for the labor of France and the United States.

Hearing this discontent, the English governing class and the influential journals are discussing what they term "retaliation." The London *Telegraph* refers to the situation as follows:

The truth of the matter is simply this, that the English people, witnessing an almost general conspiracy abroad to starve their industry by prohibitory tariffs, are beginning to discuss, with ominous earnestness, ideas of retaliation, with a view to safeguard their own interests, and that the new fiscal policy of the French may be the turning point of their future action. We may regret that the issue has been raised, but, as the Preston election shows, it is coming before the great popular constituencies in a way to demand notice and the most careful treatment from statesmen and politicians.

We have yet to learn of any conspiracy in any country to starve English industry by prohibitory tariffs. When will English journals and publicists learn that the inspiration of our tariff system is not a conspiracy against England, but simply a desire to care for ourselves? The man whose aim in life is to feed and clothe his own family might just as well and fairly be accused of conspiring to starve his neighbor.

But about retaliation. How will it work? We desire to say that so far as this country is concerned it matters not one whit how soon this policy is begun. It will not hurt us, and the implied threat does not frighten us in the least. The only articles from this country to which England can apply this policy of retaliation are agricultural products and provisions. Our tobacco she already levies a heavy duty upon, and as for the rest, even the English workman, in whose supposed interest this retaliatory policy is undertaken, will not permit its application. The spinners and weavers of Lancashire may demand a duty on our cotton cloths

but not on our cotton, and no laborer in England will listen for a moment to a duty on our cereals and provisions. They must have these, and they must get them as cheaply as possible. If the duty is levied England must still have these, and is it not one of the familiar "broad principles" that the consumer has to pay the duty? In this case, at least, it will be good doctrine.

Retaliation will hardly do if it is entered upon for retaliation. If there is anything in the circumstances of England's position that makes it advisable to levy certain duties because it is best, then there is need of a tariff in England and it will be of benefit, but for retaliation it will not work. In the meantime, while this discussion is going on, let us say that our farmers are contented with the situation and the outlook. Neither the "wheedling" of Mr. Montgredien nor the threats of retaliation will change his views nor spread the doctrine of free trade in this country.

Do Excessive Rates of Freight Make a Route Impracticable?

One of the first decisions rendered by Hon. Stanley Matthews as Judge of the Supreme Court, has a most important bearing on the transportation question. Certain steamers on the Ohio River had been carrying petroleum in violation, it was claimed, of the act of Congress prohibiting passenger steamboats from carrying certain articles considered dangerous to human life, among which are nitro-glycerine, naphtha, benzine, coal oil, crude or refined petroleum, or other like explosive burning fluids. The latter part of the act, however, qualifies this prohibition by allowing refined petroleum which will not ignite at a temperature less than 110° F., to be carried on such steamers, providing there is no other practicable mode of transporting the same. The petition contained an allegation that in the cases at bar there was another practicable mode of transportation, to wit, a railroad route. The defense was that while there was a railroad route between the two points, the charges on oil by the railroad were so excessive that the railroad did not offer "practicable modes of transporting the same" within the meaning of the law. The steamboat rate was 50 cents a barrel; the railroad, \$2. The question was, "Do excessive rates render a route impracticable?"

In this case the lower court ruled that it did. It charged the jury that "if the rate charged by the railroad for carrying petroleum from Cincinnati to Memphis was so high as to destroy the trade between these places, it would not be a practicable mode of transportation." To this the plaintiff excepted. In his opinion Judge Matthews says:

It is evident that the whole question involved in these cases depends on the meaning to be attached to the word practicable. The word originally used in this section was practical, for which the word practicable has been substituted. It was urged by counsel for the plaintiff that this change in the language of the section was significant; that the statute was remedial; that it was enacted by Congress for the purpose of protecting human life, and that therefore it should be construed liberally. Counsel for the defendant contended, on the other hand, that the statute is a penal one and must be construed strictly.

It must be admitted that, in one sense, there was another practicable route in both cases. This sense is the mechanical sense. As a physical matter the railroad connecting these points was unquestionably a practicable route. But the true meaning of the language used is to be ascertained by looking at it from a business view, and the language must be construed in a manner consistent with the protection of commerce. Congress undoubtedly meant in certain cases to impose, for the protection of human life, an absolute prohibition on the transportation of certain articles on passenger steamers. This prohibition, however, is removed under certain conditions from refined petroleum.

The subject matter referred to in this section is trade, and not the mere supplying of the petroleum at the terminal points. It embraces the trade in this article between the points in question. Congress does not intend to discriminate either for or against any points, but protects commerce between all points. Such being the case, the proviso in favor of the carrying of refined petroleum must be construed in such a way as to virtually prohibit the carrying, and thereby destroy the trade in it between any two points, but simply as regulating the transportation, so as to protect human life so far as is compatible with the interest of trade and commerce.

Now, the charge asked for by the plaintiff in this case is that if there be an oil-rail route between the points in question, this would be a practicable route regardless of distance or cost. But the giving of the section such a construction would be tantamount to an absolute prohibition, which Congress never intended, and would be virtually striking out of the section the latter half of it.

The final ruling of the Judge was as follows: "So in the cases at bar, although the railroad route between the points in question is practical in a physical and mechanical sense—in a sense that the petroleum can be transported by means of it, still it is not practicable in a commercial sense, which Congress evidently intended to give it."

Thus another decision in favor of trade, in the great struggle that is upon us over the transportation problem, has been made—a decision the effect of which, it is evident, will be far reaching, but of value above all things as indicating that the drift of decisions will be to construe the laws in favor of the trade of the country.

Pittsburgh is too far inland to be held in popular estimation as much of a seaport, especially when the witty description of the Ohio River as frozen over half of the year and dry the other half, is recalled; and yet it occupies an inconsiderable place in the history and current events of navigation. The immense tonnage of its crafts, the pecu-

liar system of towage, and the large cargoes taken out by a single steamer—6000 tons in some cases—are all matters of interest in navigation. But beyond this it is not generally known that some of the important advances in vessel construction in this country are due to Pittsburgh. The first iron boat built in the United States was the Valley Forge, built by Messrs. Robinson, Minnis & Miller, in front of their works on the south side of the Monongahela. The first steel boat built in this country was the Francisca Montana, in 1879, for South America, on the bank of the Allegheny, in front of the Duquesne Works, by James Rees, who since that time has built several others for the same service, including the Victoria, said to be the fastest boat in that country. Mr. Rees is at present engaged in putting up a double-hulled steel boat on Lake Saratoga.

Yield of Prussian Mines and Production of Iron and Steel in 1879.

The official returns of the production of iron and steel and of metals in Prussia has just been published in the *Zeitschrift f. Berg. Hutt. u. Salinen Wesen*. From it we gather the following data: In 1879, 407 collieries, employing 147,939 men, produced 37,674,648 metric tons of coal, against 416, working with 145,322 men, in 1878, turning out 35,500,167 tons. In 1879, 482 mines, employing 18,593 men, yielded 9,278,354 tons of lignite, against 8,841,366 tons in 1878, obtained from 501 mines with 18,302 men. Prussian iron mines yielded chiefly brown iron, spathic and specular ores, the total footing up to 3,153,091 metric tons in 1879, against 2,955,872 tons in 1878. From salt mines, 142,857 tons of common salt, 41,181 tons of chloride of potassium and 306,995 tons of other alkali salts were taken in 1879, quite a considerable increase over the year preceding it. The salt works in Prussia added 230,730 tons to this output.

Out of 227 blast furnaces built in Prussia, 162 were in blast during 1879, against 163 during the preceding year. Of these 130 were smelting with coke, 30 with charcoal and two with mixed fuel, which, together, gave employment to 14,399 men. These furnaces produced 1,639,676 tons of pig in 1879, against 1,568,061 tons in 1878; 622 foundries turned out, with 912 cupolas, 304,612 tons of castings, against 277,190 tons during the preceding year; 277 mills, having 1348 puddling furnaces at work, made 1,608,020 tons of rolled wrought iron in 1879, against 975,136 tons in 1878. There were in operation 31 Bessemer converters, 23 open-hearth furnaces, 147 crucibles and 7 cement steel furnaces, during 1879, which, together, produced 469,096 tons of manufactures of steel, against 462,506 in the preceding year. The production of spelter amounted to 96,484 tons in 1879, and to 94,637 in 1878. Lead, including litharge, was produced to the extent of 97,156 tons in 1879, and 78,369 tons in 1878. The production of copper was 10,165 tons in 1879, and 6339 tons in 1873. The total number of men employed in the metallurgical works in Prussia was 102,729.

American Enterprise in Newfoundland.

It is a little odd that while some of the "truly loyal" in the Dominion and outlying provinces are soundly berating the "Yankees" on account of the fishery difficulties or some other supposed grievance, American capital is constantly going within the royal jurisdiction for investment, and mercantile projects are planned and executed by business men on either side of the line in the most fraternal accord. Boston is putting several millions of dollars into the Canadian Pacific Railroad; shippers are planning for an extensive business on the Welland Canal, and it has devolved on New Yorkers to initiate a railroad of some 350 miles, through which to develop Newfoundland. An engineer and a competent staff will soon leave, under royal assent, to avail themselves of the extensive land grants and promised subsidy by surveying the line, and hopes are entertained that the first 50 miles, connecting St. John and other centers of population, will be built within a year. Improved machinery and equipments will go from the United States, but all the rails will come from England. The final aim is to reach the rich mining regions at the further terminus, though vessels in the cod and halibut fisheries will put in at intermediate ports, and forward their cargoes at once by rail to the principal shipping points. The copper ores of Newfoundland are represented to be very rich and abundant, and as private capitalists are expected to erect smelting works, Swansea will no doubt eventually derive large supplies therefrom. The promoters express much enthusiasm, believing that a prosperous future is about to dawn on an extensive territory which remains to this day a terra incognita, excepting as its name is associated with fisheries on the banks. Furthermore, they anticipate the time when the transatlantic voyage can be made, via the new route, in five days. It is a curious fact that so far from meeting with encouragement from Canadian statesmen, some of those most influential have manifested a decided hostility to modern innovations in whatever shape.

The president of the Tin Plate Association of the United Kingdom testified before a Select Committee of the House of Commons, recently, that the total productive power of the United Kingdom for tin plate was above

8,000,000 boxes annually, and that the export trade was 4,500,000 boxes, chiefly to America. In 1858 the make was only 1,200,000 boxes, an increase in 22 years of nearly 600 per cent. Why has not some of this been made in the United States? Why is it that when we have been increasing as rapidly as England in nearly all other metal manufactures we have not increased in this? Though the increased consumption of tin plates in this country has been enormous, there is not a box of tin plate made here. All the thousands, yes hundreds of thousands of tons of steel and iron plates that enter into the manufacture of tin plates are lost to our mills, our furnaces, our mines, our labor, and all on account of an absurd and unintelligent decision of the Treasury Department. The first duty of Congress when it meets in December should be to remedy at once this state of affairs, not only with reference to tin plates, but steel blooms, steel wire rods, cotton ties, &c.

Mr. Leavitt's New Engine for the Calumet and Hecla Mine.

Upon our first page we publish a paper read by Mr. E. D. Leavitt, Jr., at the Hartford meeting of the Society of Mechanical Engineers, upon an engine now in process of construction, from his designs, for the Calumet and Hecla mine.

The engine, on account of many points of novelty in construction and boldness of design, is well worth the careful attention of both the engine builder and engine user. Although to the eye, upon first glance, the engine seems to be an ordinary compound inverted marine engine, set to drive a fly-wheel through gearing, yet a greater mistake could hardly be made. The engine is compound and inverted, it is true, but there the resemblance to other inverted engines ceases. The high and low pressure pistons are connected directly to a beam or "rocker." The main connecting rod takes hold of a pin on the top of this rocker. To those familiar with the now famous "Lynn" pumping engine, a certain general similarity of arrangement will be recognized. With reciprocating parts weighing 25 tons and a 6-foot stroke, the engine is driven at 60 revolutions per minute, giving a piston speed of 720 feet, a most remarkable figure. Such work, we think, is without a parallel in the history of high speed engines. Twenty-five tons of metal making 120 vibrations per minute, rarely, if ever, can be matched even in our fastest running propeller engines. The nearest approach, if we are not mistaken, are the long-stroke engines of Mr. Baird. Some of these are said to make 80 or 90 revolutions with 6-foot stroke, but in them the reciprocating parts are of necessity much lighter, as theory would indicate. In the smooth and quiet working of engines of this kind we have a sufficient proof of the correctness of Mr. Porter's theory in regard to action of the weight of reciprocating parts in equalizing the power in high-speed engines.

The use of high speed and high pressure have enabled an enormous reduction in the size and consequent cost of the engine to be made. In fact, the 4700-horse-power has been concentrated in an engine whose foundations are only 18 feet wide by 60 feet long. There are many engines in this country of 800 or 900 horse-power—or, say, one-sixth that of the "Superior"—and carrying 60 pounds of steam and running at a slow rate of speed, that occupy fully as much space.

Though we have no data to present as to the economy of this engine, it is fair to presume that it will work as well as any of the other engines built from Mr. Leavitt's designs, all of which have shown a high degree of efficiency. Indeed, because of the more favorable conditions of high speed and high pressures, we think we are justified in looking for a better economy record than has been given by any of his previous work. A hoisting engine built by Mr. Leavitt for the same company, and put at work in 1877, showed on a ten days' run a steam consumption of only 17.3 pounds of water per horse-power. This was, we hardly need say, a very remarkable performance. That engine labors under the serious disadvantage of having wide variations in its load. Internal condensation was, therefore, frequently large, and at such times the steam consumption was necessarily great. In the present engine this will be in a great measure avoided. The cylinders are jacketed on both sides and heads, and the reheaters between the cylinders will thoroughly dry the steam before it enters the low-pressure cylinder. The large steam drum near the engine will be a source of great economy, and, if properly managed, will deliver dry steam to the engine at full boiler pressure.

Steam drums or separators close to the cylinders can be made to greatly reduce the losses from condensation, and when the main steam pipe is small or long and exposed, they become almost indispensable in keeping up the pressure in the steam chest and freeing it from moisture. The boilers used in connection with this engine are worth notice. They are of the locomotive type, but of unusual size. They have 34-inch barrels, and are 33 feet in length. Steel plates and double-strapped butt joints give great strength. The fire-boxes are large, each one being 8 by 4 feet, and there are two to each boiler, as well as a combustion chamber.

No one of the striking features of the engine is sufficient to make it remarkable for

efficiency, but their scientific combination and adaptation to the peculiar conditions of the case in hand, will enable results to be obtained which seem incredible to the layman or the rule-of-thumb engineer. It is a most encouraging fact that a great mining company should recognize the advantages of putting themselves so completely into the hands of the steam engineer when they wish for power, and allow him to follow the dictates of his experience, judgment and scientific knowledge. It too frequently happens that a great corporation is too conservative to allow any departure from the beaten tracks, even when great economies are to be attained. We could even mention a case where a large power user abandoned the plans of one of our best and most successful steam engineers and adopted a common, plain slide-valve engine, because his superintendent could understand that kind of an engine, but could not "take in the science" of the other. As 1500 to 2000 horse-power was needed, the loss following such a decision can easily be imagined.

The French Tariff.

The new French tariff law, promulgated on the 8th of May in the *Journal Officiel*, and which will take effect on November 8th, contains the following data relating to the duties on articles of interest to the iron, hardware and allied trades, the figures given being in francs per 100 kilograms:

Iron ore.....	free
Pig iron.....	2
Bar, angle and T iron.....	6
Hoop iron, more than 1 mm. thick.....	6
Hoop iron, less than 1 mm. thick.....	7.50
Wire rods.....	6
Sheet iron, more than 1 mm. gauge.....	7.50
Sheet iron, less than 1 mm. gauge.....	10
Tin orterne plates, copper coated, or galvanized sheet.....	13
Wire, galvanized, coated with copper or tin, or not, less than 5-10ths mm. gauge.....	10
Wire, above 5-10ths mm. gauge.....	10
Steel rails.....	6
Bar or ingot steel of all kinds and sheets.....	9
Hoop or sheet steel above 1/2 mm. gauge.....	9
Hoop or sheet steel below 1/2 mm. gauge.....	13
Steel wire for instruments.....	20
Turnings.....	free
Cast or wrought scrap.....	2
Copper ore.....	free
Copper, pure or alloyed with zinc or tin, in ingots or bars.....	free
Copper, pure or alloyed with zinc or tin, rolled or hammered, in bars or plates.....	10
Copper wire.....	10
Lead ore.....	free
Pig lead and old lead.....	free
Lead alloyed with antimony.....	3
Roller or hammer lead.....	3
Tin ore and tin.....	free
Zinc ore and zinc.....	free
Mercury, arsenic, nickel.....	free
Antimony regulus.....	free
Manganese ore.....	free
Stationary engines, with or without boilers, with or without fly-wheels.....	6
Marine engines, with or without boilers.....	12
Locomotives and portable engines.....	10
Boilers, cylindrical.....	12
Boilers, tubular.....	12
Boilers, steel.....	25
Sewing machines.....	6
Machine tools and machinery not specified, composed of more than 75 per cent. of cast iron.....	6
Steel wagon, car and locomotive springs.....	10
Iron tools.....	20
Steel tools.....	20
Needles less than 5 centimeters long.....	248
Needles more than 5 centimeters long.....	174
Files.....	30
Steel pens.....	150
Ordinary cutlery.....	250
Other cutlery.....	375
Fine cutlery.....	600
Carriage or saddle hardware.....	8
Locks.....	12
Chains and cables.....	8
Machine-made nails.....	12
Hand-forged nails.....	12
Wood screws less than 7 mm. in diameter.....	12
Wood screws more than 7 mm. in diameter.....	8
Nuts and bolts.....	8
Tubes, welded or drawn, larger than 2 mm. inside diameter.....	11
Tubes, welded or drawn, smaller than 2 mm. inside diameter.....	20
Iron or sheet household articles not specified, painted or polished.....	14
Iron or sheet household articles, tinmed, enameled or varnished.....	16
Steel wire rope.....	25
Copper, brass or bronze kitchen utensils.....	20
Lead pipe and manufactures of lead.....	3
Zinc, Articles of, of all kinds.....	8
Nickel or German silver, Articles of.....	100

Master Car Builders' Association.

The Master Car Builders' Association closes its 14th annual session to-day. The attendance has been large, and the proceedings of great interest. The president, Mr. Leander Garey, of the New York Central and Hudson River Road, made the opening address. He said that some master builders had been somewhat discouraged by the slow progress made in the general adoption of the standards recommended by the association, but he thought the good results already obtained ought to stimulate master car builders to more thorough and active work in support of the association. He called attention to the necessity for a common standard in the construction of certain parts of cars requiring frequent renewal, and urged unanimity of action among railroad men in the proposed revision of the present rules governing the repairs of foreign cars and settlement for the same in case of destruction. Referring to the fact that extraordinary expense and many accidents arise from the use of bad coupling links and pins, he suggested that a particular kind of iron should be specially prepared for their manufacture.

We think that the association may well feel proud of its work in introducing and obtaining recognition of its standard axle. The work was a herculean one, and no one should be discouraged because it has been slow.

The Committee on Standard Journal-bearing, Journal-box and Pelestat submitted a report advising that no alterations in this standard should be made which would prevent the interchangeability of the old and new parts. They recommended some minor alterations not affecting the interchangeability of parts, and suggested the adoption of a resolution declaring that the drawing submitted with the report represent the standard form and proportion which should be generally adopted for cars and locomotives. After a good deal of discussion the report was accepted and the committee were continued for another year.

The Committee on the Present Construction of Screws and Nuts reported, giving a statement of the progress made by Messrs.

Pratt & Whitney in the work of constructing standard gauges which will make it possible to establish uniformity of sizes in screws and nuts, with which our readers are already acquainted. The report was accepted.

The Committee on Train Brakes also presented their report, which was accepted. Several questions for consideration were offered by members. The most interesting of these was offered by Mr. Smith, the secretary of the association, as to the amount of wear and tear on cars of 20 tons capacity. In propounding this question he expressed the opinion that after a while 25 tons would be carried in cars. A discussion followed, and the opinion seemed to be very general that heavier loads than are now made up can be carried with safety by the existing freight cars. One member said that 30 tons were carried oftener than 20 tons in the cars of his road.

Various amendments to the constitution formed the subjects of yesterday's discussions.

OBITUARY.

Mr. Samuel Griffiths.—We regret to record the sudden death, recently, at Dalton Junction Station, Eng., of Mr. Samuel Griffiths, of Cannon street, London, who for many years had been in the iron trade, as, in addition to his regular business of merchant broker, he has been proprietor and editor for the past 30 years of the *London Iron Trade Exchange*, which he founded as *Griffiths's Iron Trade Circular*. The late Mr. Griffiths in early life, it is stated, carried on with success the business of a manufacturing chemist at Wolverhampton. With the profits realized in this business he subsequently set up as a banker in that town, and became the proprietor of a number of iron works. In 1851 he contested the Parliamentary representation of Wolverhampton, and came second on the poll. Mr. Griffiths twice did considerable service to the iron and coal trades, by using his influence in bringing to an end a 10 weeks' strike among the colliers and an 18 weeks' lock-out of the ironworkers. In 1863 Mr. Griffiths left the South Staffordshire district, afterward establishing himself in London as a metal merchant. In 1873 he published "A Guide to the Iron Trade of Great Britain."

William Taylor.—William Taylor, one of the oldest merchants of Philadelphia, died on Wednesday morning. He was born near Hartford, Conn., in 1795, and was one of a family of five brothers and two sisters. With four of his brothers he went to Philadelphia in the beginning of the present century, and they severally engaged in business there. He and his brother George established a house on Front street, near Arch, for the importation and sale of tin plates and metals. They remained in this business nearly all of their lives, and the house is still continued under the firm name of the N. and G. Taylor Co., and ranks as one of the first business houses of the kind in that city. George Taylor, one of the members of the original firm, died about seventeen years ago, and his two sons succeeded to the control of the business. William Taylor was a veteran of the war of 1812. He was a thorough business man and a good citizen. He was an ardent Whig and at one time a member of City Councils.

Electricity as a Mechanical Power.

Mr. Alexander Siemens, in a lecture before the Society of Arts in London, is thus reported:

The practicability of an Electric Railway is already demonstrated. People may see it for themselves at the Crystal Palace, and the German capital gives yet more convincing proof. The great potency of the invention consists in the transmission of the motive current by a simple wire. Whether through a cable or mere strand, nothing can be more facile than this mode of communication. The wire can be buried or hung aloft, or twisted and turned in any desired direction. The distance to which the current can be conveyed, and the amount of energy lost in transit, are matters which more immediately affect the economical aspect of the question. But allowing that only half the power expended can be recovered and turned to account. Mr. A. Siemens shows that cheapness would be effected in many instances as compared with the use of small steam engines. The idea is that of a central station, where powerful steam engines, working on the most economical principles, would drive a number of electrical machines to produce the required currents. It would be easy to lay wires from the central station, in the same way as we see them now laid in cast iron pipes in the city. From these main wires there would be junctions leading into the houses, and there would be no difficulty in providing two separate currents—one for lighting and the other for power—to be used as required. Already we have the city illuminated by means of currents generated at a distance once thought impracticable. The transmission of power by the electric current is shown, not only by the Siemens Railway, but by various other applications. Cranes are worked and ropes are pulled by this agency at Charlton, near London, while double furrow ploughs and also a threshing machine have been worked by a Gramme machine in France. Dr. Siemens is making the electric current perform all kinds of handiwork at his country residence near Tunbridge Wells, the result being that one man at the farm is enabled to do the work which otherwise would occupy three—a fact which may claim attention from the agricultural interest hard pressed by foreign competition. Sir William Armstrong has utilized the power of falling water for the working of a machine, whereby he gains sufficient electricity to light up 30 or 40 Swan lamps. Dr. Siemens turns a wire fence to account by making it take the return current. It is to be hoped that no ingenious device of this kind will lead at any time to an unexpected mishap. The danger of meddling with cold iron may assume unwonted proportions, if powerful electric currents are to be traveling along wire fences and other unsuspected places.

AMERICAN INSTITUTE OF MINING ENGINEERS.

MEETING AT STAUNTON, VA.

(Continued.)

On Thursday a special train left Staunton by the Chesapeake and Ohio Railroad for a visit to a number of furnaces and mines along that road. The first point of interest touched was Ferrol, where the Grace Furnace, belonging to the Pennsylvania and Virginia Iron and Coal Company, of which Mr. J. F. Lewis is general manager, is located. The Grace is a coke stack 45 feet high, with a 10-foot bosh, making from Ferrol and Clifton Forge ores from 15 to 17 tons of forge iron per day for Western markets. It has a 20 by 48 Weimer blowing engine, the blast being heated to 800 degrees in iron hot-blast ovens. The stock, iron ore and limestone, are run direct from bins into the tunnel head, while the coke is hoisted from the level of the railway by an incline.

After a short stay at the Grace Furnace, the train proceeded to the junction of the Chesapeake and Ohio Railroad and the narrow gauge road leading to the mines and furnaces of the Longdale Iron Company, Messrs. Friestone, Pardee & Co. The road, which follows a picturesque valley, is seven miles to the furnaces, which are 230 feet above the track of the Chesapeake and Ohio Railroad. Passing by the furnaces the party made the additional 4 1/2 miles to the mines, which are located 560 feet above the furnaces. The Longdale iron ore deposits belong to a belt traced for a long distance. Their thickness ranges from 6 to 20 feet, the measures being considerably disturbed. After an inspection of the mines the cars were taken and the party returned to the furnaces, where only a brief stay, too short to do justice to the plant, was made. Although at first sight it may appear strange to find the furnaces of the Longdale Company located so far from the main road, the development of the enterprise and some important considerations justify the choice of the site. The plant is very substantial and well arranged, and on every hand there are evidences of careful and conscientious management. There are two coke stacks on the site of the old charcoal furnace, one of which is 60 by 14 feet, while the other is 60 feet high and has an 11-foot bosh. Both make forge iron, the capacity being about 450 tons per week, from ores averaging 46 per cent. of iron in the furnace and carrying 0.5 per cent. of phosphorus. The stock is hoisted up to the tunnel head by an incline run by water engines. The power for the latter is furnished by a flume 4300 feet long, which delivers the water to the engines with a head of 60 feet. The furnaces are blown with Weimer engines, having a diameter of blowing cylinder of 5 feet and a 4-foot stroke. The blast is heated in U-pipes to about 800 degrees. The coke is obtained from the company's iron ovens at Sewell, on the New River, and it is stated that at one time from 18 to 20 cwt. of coke were used for making 1 ton of iron. With a grade of coke not quite so good, the present consumption is 22 cwt. The limestone is found in abundance and of good quality, in close proximity to the furnaces. The men employed are almost exclusively colored, and it is stated that in every respect they are satisfactory workmen, which is confirmed by the managers of other furnaces in the vicinity.

Returning by the narrow gauge of the Longdale Iron Company, the members were carried to Low Moor, where an elegant lunch awaited them. A visit was then made to the mines of the Low Moor Iron Company. The furnace plant of the Low Moor Company is modern, and is built for fast driving. We were unable to obtain details, but it was stated that the three small Whitwell stoves used for heating the blast, were not sufficient to carry the temperature of the large volume of blast forced into the furnace above about 800 degrees. Judging from appearances, the furnace did not appear to be in the best condition for doing a large amount of work. Again taking the train, the Institute proceeded to White Sulphur Springs, where a trying delay in securing accommodation for the unexpectedly large number of guests occurred. In the evening the final session was to take place in the ball-room of the White Sulphur Springs Hotel. By the request of many members, Major J. Hotchkiss, of Staunton, repeated a lecture on the Shenandoah Valley campaign, an outline of which had already been given by him.

Owing to the lateness of the hour and the fatigue of the members after the excursions of the day, it was thought best to read the remaining papers by title. The following are the titles of the papers thus read:

The Hydro-metallurgy of Copper and Its Separation from the Precious Metals, by Dr. T. Sterry Hunt, Montreal, Canada.
The Foreign Substances in Iron and Steel Combinations, by F. L. Kleinschmidt, St. Louis, Mo.

Notes on Gold Mill Construction, by A. J. Bowie, Jr., San Francisco, Cal.
Index to American Engineering Articles and Papers for 1880, by Prof. H. S. Munro, New York City.

The New Westmoreland Shaft, by W. P. Little and T. B. Stearns, New York City.
Filtering in Industrial Operations, by P. Barnes, Springfield, Ill.

On the Solution of Pig Iron and Steel for the Determination of Phosphorus, by N. H. Muhlenberg and T. M. Drown, Easton, Pa.

Blast Furnace Hearths and Linings, by John Birkinbine, Philadelphia.

A New Mining Lamp, by P. Frazer.

The Hematite Iron Ores of Central Pennsylvania, by Charles A. Ashburner.

An Analysis of the Casualties in the Anthracite Coal Fields from 1870 to 1880, by H. M. Chance, M. D.

There were then elected 44 new members and 20 associates, whose names were recommended by the council.

Prof. Frazer made a statement with regard to a valuable collection of specimens connected with the New York Obelisk, which had been presented to the Institute by Lieutenant-Commander Gorringe, and he offered a resolution expressing the thanks of the Institute for this valuable and unique collection. The meeting was then adjourned.

Early on Friday morning a start was made for an excursion through the New River and Kanawha coal fields, on a train furnished by the Chesapeake and Ohio Railroad. The first point of interest visited was Quinnimont Furnace, a coke furnace 53 feet high and having a 15-foot bosh, which has now been in blast for 2 years and 9 months. One-half of the supply of ores is obtained from mines on the James River, the thickness of the veins of which varies. The other half is made up of ores from the 5 to 10-foot vernal Ferrol, and of fossil ores from the 18-inch deposits at Clifton Forge. They are brown hematites, and run from 40 to 42 per cent. in the furnace, carrying 0.5 per cent. of phosphorus.

The consumption of coke per ton of pig is about 21 cwt., and of limestone 1550 pounds. The specialty of the furnace is the manufacture of No. 1 foundry iron for Western markets, the pig selling as far west as Indianapolis, Detroit and St. Louis. The production is about 30 tons per day. Blast of 2 1/2 to 3 pounds pressure is furnished by a vertical blowing engine, with 48 by 84 blowing cylinder, built by Messrs. Robinson, Rea & Co., of Pittsburgh. It is heated in two iron stoves to 800 degrees. The coal for the Quinnimont is mined three-quarters of a mile from the furnace, on Laurel Creek, and is brought down to the valley by a 2200-foot incline. The seam is 3 feet to 3 feet 4 inches thick, and the coal obtained from it averages 76 per cent. of fixed carbon. It is converted into coke in 105 beehive ovens 6 feet high and 11 1/2 feet in diameter, each of which has an average capacity of one ton of coke per day. The yield is, owing to the high percentage of fixed carbon in the coal, the highest on the New River, the average of five months working being 66.7 per cent. One-third of the coke made is 72-hour coke, the rest, 48 hour coke. The conviction appears to be gaining ground that it is more economical to make the former. Proceeding down the valley the Stone Cliff mines were first reached. There are 60 coke ovens, and an additional number (40) are building. The product is 60 tons of coke per day, all of which is sent to Ironton. The coal is taken from a 3 1/2-foot vein by an incline of 30 degrees 700 feet long. Traveling a few miles further brought the party to the Fire Creek mines belonging to Mr. M. E. Miller. A 3-foot vein, connected with the railroad by a 700-foot incline, laid with three rails and a siding half way, conveys 275 to 325 tons of coal per day, of which the broken coal and a part of the slack is shipped, while the rest of the slack is coked in plant of 60 ovens. The next point of interest visited was Sewell, from which the Longdale Iron Company draws its supplies of coke. The vein is 3 to 4 feet thick, and at the present time has a capacity of 160 tons per day, which are brought to railway level by a 2100-foot incline. The company owns a plant of 120 11-foot ovens for making 48 to 72-hour coke, the yield being 60 to 65 per cent. A few miles below Sewell, on the New River, is the property of the Nuttallburg Coal Company, who coke only their slack in 60 ovens. They ship lump and run of the mine to the extent of 5000 tons per month. After a few minutes' survey of the breaker the party again entered the train, and after a ride of a few miles was carried to Hawk's Nest, where ladies and gentlemen, jumbled into mine cars, were soon slowly ascending the picturesque gorge that leads to the mines. Though the distance to the mines is only 3 1/2 miles, the difference in level is nearly 900 feet, and the road appeared to many, notably to the ladies, to be anything but safe. At a distance from the mines in the woods an elegant lunch was spread, and the members did full justice to the good things before them. Mr. Wm. N. Page, the energetic manager of the Iron and Steel Association of Virginia, a new organization owning the property, took charge of the party. He showed them the mine which is now opened by 1 1/2 miles of entry work. The vein is 11 feet thick with three partings, of which one keeps its position in the mountain and is of varying thickness. The mine has been worked on a limited scale for two years, and though it will have a capacity of 1000 tons per day within two months of the present time, it does not now, with one locomotive, ship more than from 300 to 400 tons per day. The company own an estate of 2500 acres, on which there are seven other seams, some of them of considerable thickness, and with coal of very good quality. The veins have a uniform dip to the northwest of 80 to 100 feet to the mile. The main entry is run north 60 feet; east and parallel entries are run in distances of 400 feet. The rooms are 21 feet wide, and the pillars 30 feet. The latter are taken away in three slices. The main work advances at the rate of 10 feet per week, while the entries are driven at the rate of 12 feet per week. Powder is used only in the butt entries. Miners are paid 40 cents per ton for picked coal, loaded on cars, the miners putting up their own props and laying their tracks, materials being furnished.

The Iron and Steel Association contemplate the erection, at an early date, of 100 Coppée coke ovens, in order to practically test the question, for the first time in this country, of substituting them for the old-fashioned beehive, which is so wasteful. Mr. Page, the manager, is convinced that a very considerable saving will be effected, and that the coke made will be better able to bear a heavy burden than the material now made in the ordinary beehive oven. Should the experiment prove successful, and there are strong indications that it will, then the coking business of the New River Valley will undergo a revolution, and the matter receive in other districts the attention which its importance demands. The company also contemplate the erection of a large modern blast furnace at Goshen, near Staunton, and intend to open out their ore lands, which form a continuation of those of the Longdale Company, by a loop line, and should the business warrant it will also build a mill for the manufacture of iron.

On all sides there is abundant evidence that the exceptional natural advantages of the New River region are commencing to attract capital, and are being developed in an intelligent and energetic manner. The deposits of iron ore throughout the region are numerous and extensive, and we have said enough of the coal openings to show their

LAMBETH'S IMPROVED FLY FAN.

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April 17, 1877; March 9, 1880; June 8, 1880;
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Made in three styles—bronzed, nickel-plated, or decorated china base, to meet various tastes, with the corrugated tubular stem, and projections nickel-plated, to which the Fans are attached, revolving noiselessly above the head, with no inconvenience to persons seated at the table.

The machine is self-acting, keeps flies off the table, winds up like a clock, and runs about one hour and a half at each winding.

It is light and portable, a perfect substitute for the old fly brush in the hands of a servant, and occupies less space on the table than a caster.

It is easily set on a bed or chair to keep flies off children or the sick.

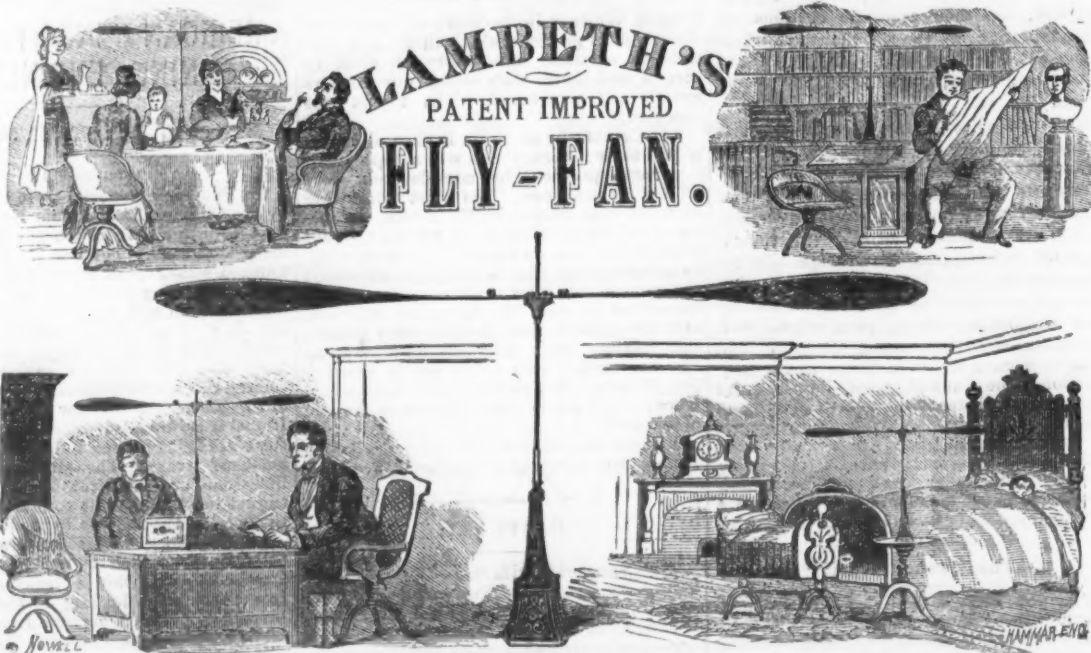
To the invalid, in summer, it is a most welcome companion.

Hardware, Housefurnishing, Crockery, Jewelry Stores, &c., find it one of the best and fastest selling articles ever introduced. Over 50,000 are now in general use in the best hotels and in private families throughout the country.

For the trade the Fans are securely packed one dozen in a case; each case weighing, according to style of base, from 75 to 120 pounds.

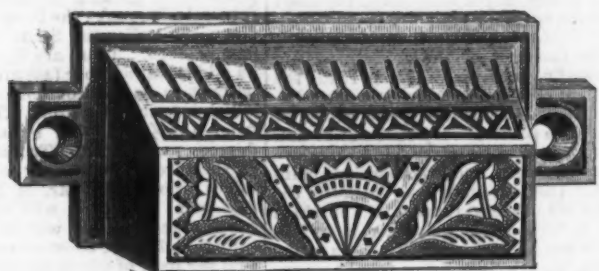
For prices and further particulars address general agents.

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McBride & Co. Atlanta, Ga.
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WEYMOUTH'S PATENT.



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The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight suitable for shipping by land or water to any part of the world.

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METAL
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Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., \$250.

We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS.
We call attention to infringements of the Weston Machine, in which Automatic switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

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PHOSPHOR-TIN!

Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merit would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is PHOSPHOR-TIN. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready made Phosphor-Bronze can be had in the market. A trial ought to be made by everybody who is using it.

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have long been conceded to be the best ever made. The quality and finish of these goods shall always be maintained.

To meet the demand for a cheaper line we offer the trade our

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On these we cannot be undersold. Price is about 25 per cent. less than the "American."

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THE
'RAPID TRANSIT' TRAP

Has no superior, and is a sure and certain catcher of mice. With the Metal Platform resting on wood bottom of Trap, an invitation is always extended to Mice of whatever "kind, color or condition of race," into secure and grated quarters, from which they are released by opening cover of Trap and depositing contents into a pail of water.

The Mice go in at a rapid rate, And each one sets it for his mate.

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Returning

value. The measures are regular and almost horizontal. The veins crop out along the sides of the mountains fronting on the New River, but as yet, owing to the location of the railroad, have only been opened along its eastern bank. There is no trouble whatever in draining and ventilating the mines, and everything combines to make mining and shipping cheap. The Chesapeake and Ohio Railroad appear to be doing all in

those who were leaving the party to go by packet direct to Lynchburg, the company started on their homeward trip, and, reduced in number, reached Williamson's, whence about one half returned to White Sulphur Springs to spend the Sunday in comfort, while the rest resumed their journey at a later hour. Thus ended the Virginia meeting, the remembrance of which will long be cherished

tion of iron ore and its products to near 80,000 tons since the opening of navigation this year.

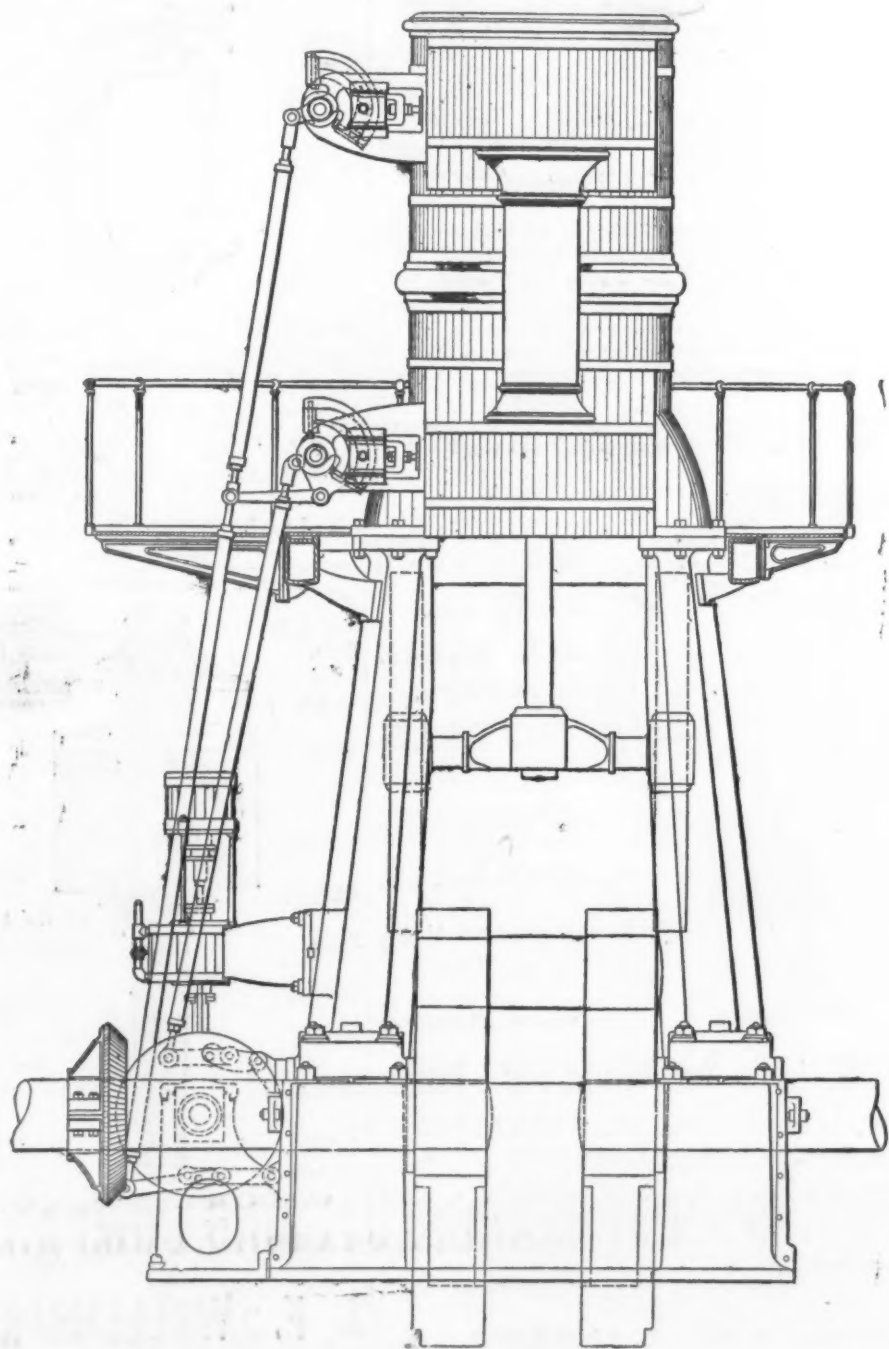
The Iron Ores of Putnam Co., N. Y.

Within forty miles of New York, on the Harlem Railroad, in Putnam County, is located one of the finest iron properties in

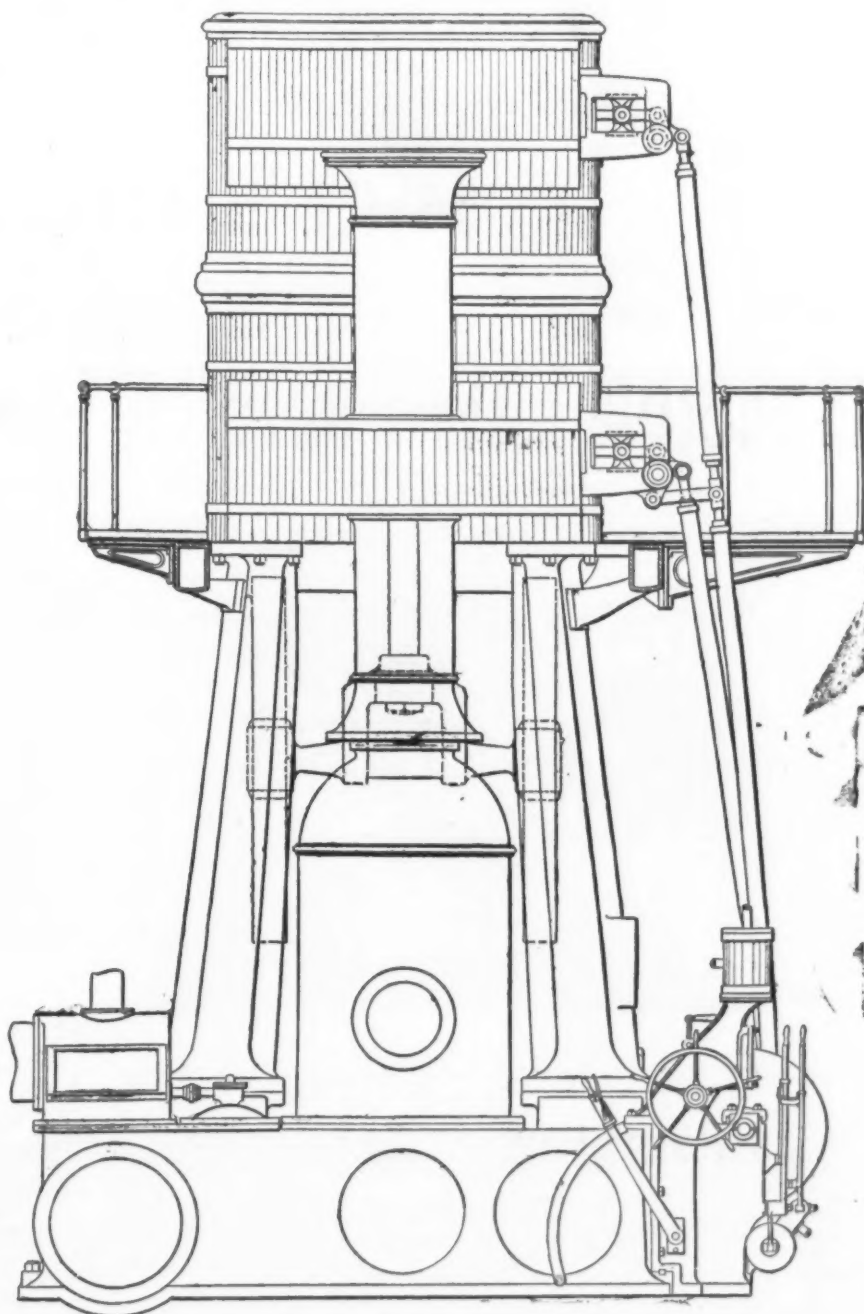
The group of Putnam County mines, to which we particularly refer at present, are known as the Cheever-Durant mines. They are located some two miles south of the Tilly Foster. The property extends from the town of Brewster's to Croton Falls, a distance of four miles. Two openings have been made and named respectively, the "Theall Tunnel" and "McCullum Shaft." The former enters the mountain at a height of 200 feet

both openings, recently made, exhibits one of the most desirable commercial products of iron ore known in the country:

Magn. Oxide of Iron.....	75.65
Protoxide of Iron.....	.83
Manganese Oxide.....	.09
Alumina.....	4.43
Lime.....	1.52
Magnesia.....	.27
Silica.....	14.89
Phosphoric Acid.....	.37



ELEVATION OF HIGH PRESSURE CYLINDER, FROM CRANK END OF ENGINE.—See page 1.



ELEVATION OF LOW PRESSURE CYLINDER.—See page 1.

their power to aid the development of the mineral wealth of the region. The following analyses of the coal, taken from Mr. S. Fisher Morris' paper on the "New River Coal Field of West Virginia" (Transact. Am. Inst. M. Eng., Vol. VIII, p. 261) will show the nature of the coal.

Coal.	Fixed Carbon.	Volatile matter.	Ash.	Sulphur.	Water.
Quinnmont.....	75.89	18.10	4.63	0.30	0.94
Fire Creek.....	75.02	22.34	1.47	0.56	0.61
Sewell.....	72.38	21.38	5.87	0.37	1.03
Nuttallberg.....	69.00	29.59	1.07	0.78	0.34
Nuttallberg.....	70.67	25.35	2.10	0.57	1.35
Hawk's Nest.....	63.10	32.04	2.15	0.74	1.40

Leaving the New River, after a rapid descent from the Hawk's Nest mine, the party entered the valley of the Kanawha River. Passing down the latter, a good opportunity was offered to view the splendid scenery, but no time was left to examine any of the mines along the route, and after reaching Coalburg the train returned to White Sulphur Springs, which was reached at such a late hour that the idea of holding a formal dinner, which has become one of the features of the Institute meetings, was abandoned.

On Saturday morning the members were taken by a special train into the James River Valley by the Richmond and Allegheny Railroad, which is now being built partly along the banks of the old James River Canal, the locks of which are still visible along the route. The members were shown the arch at Clifton Forge, from which the spectacular ores supplying some of the furnaces are taken. No stoppage, however, was made until Gilmore's Mill Station was reached, where the party left the train, and by a few minutes' walk reached the Natural Bridge, which is now made so easily accessible since the construction of the Richmond and Allegheny Railroad. The gorge, spanned by its lofty arch 40 feet thick, 215 feet above the level of Cedar Creek, was for hours filled with the engineers and their ladies, who were eagerly seeking new points from which to admire nature's wonder; and with appetites whetted by good exercise, full justice was done to the dinner spread at the inn near the bridge. A number of gentlemen, among them Secretary James G. Blaine, Wm. H. Barnum and Gov. Cornell, have joined to purchase for \$20,000 the tract on which the Natural Bridge stands, and intend making a public park of 600 acres and building a large hotel, to be completed at an early date. During the stay at the bridge, Mr. H. C. Parsons, vice-president of the Richmond and Allegheny Railroad, made a very interesting speech on the advantages and aims of the new railroad enterprise.

Returning to the station, with a farewell to

by those who attended it. The graceful hospitality of the Virginians, the earnest and unceasing endeavors of the gentlemen of the local committee, and the generous assistance of the managers of the Shenandoah Valley, Chesapeake and Ohio, and Richmond

the country. It is said that during the revolutionary war a section of these immense deposits was worked and the ore taken to Danbury, Conn., and made into pig iron. It was, however, to the discovery of a still more valuable portion of the tract,

above the level of Croton River, and is 26 feet wide by 40 feet high. The tunnel has been worked to a length of 200 feet with a 30-foot cross cut, showing solid ore on all sides. The vein, as proven, appears to be from 70 to 100 feet in width and is about

Sulphur.....	.42
Titanic Acid.....	.27

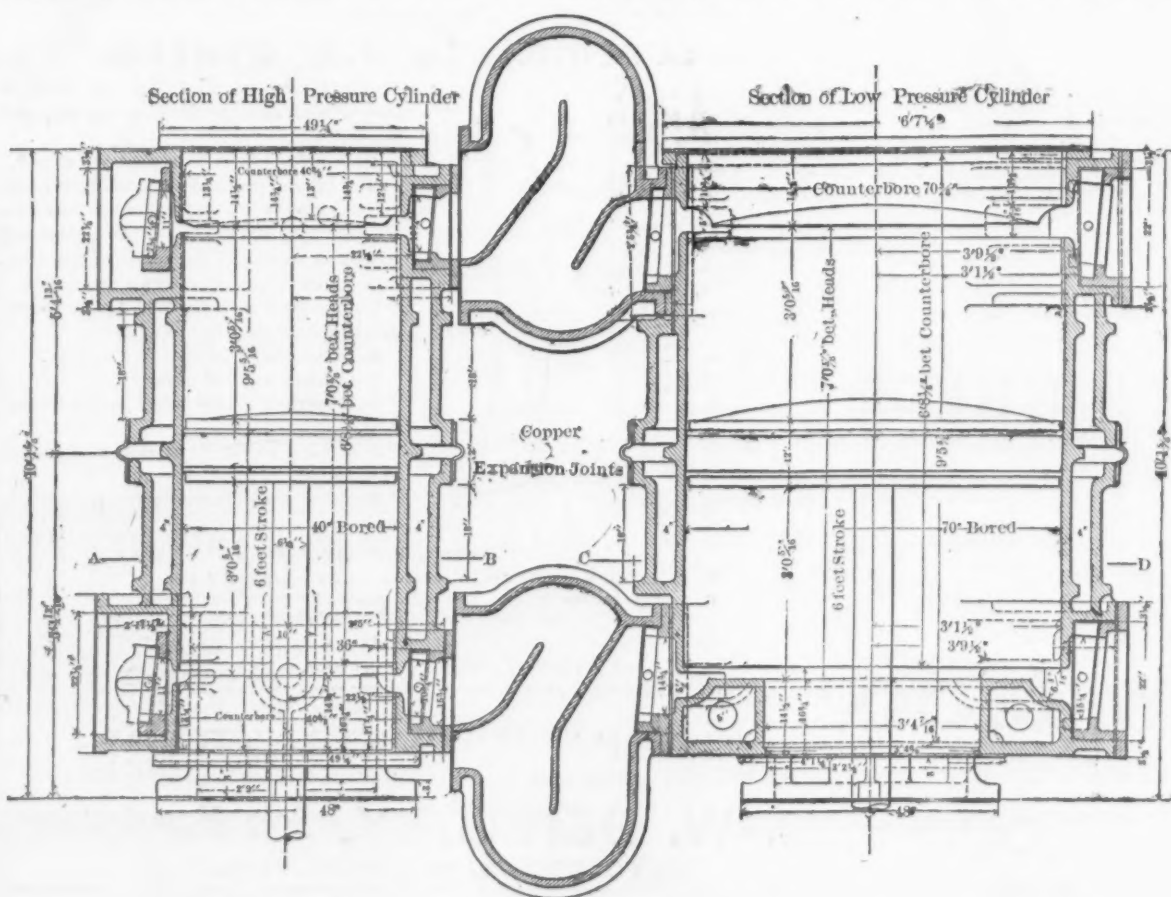
Total.....	99.44
Metallic Iron.....	55.42
Metallic Manganese.....	.06
Phosphorus.....	.16

We observed that some 5000 tons of the ore had been already removed from the tunnel and appeared to be of very good quality. The metallurgical value of these ores is too well known to call for any extended comment. As an admixture for low grade hematites they are indispensable, the magnetic ores imparting a strength to the product that is necessary for commercial purposes. These ores are now delivered f. o. b. at Port Morris at the rate of \$3.00 per ton for 50% ore, which is considered a very low figure for ores possessing so many superior characteristics.

A new railroad connection—viz., New York and New England—will shortly place the product of these mines to the greatest advantage in the Eastern and Middle States. Mr. W. E. Rider, the general manager at the mines, has had a wide experience in prosecuting mining operations.

In England a very useful material has been brought out which, under the name of "J. Richards' Plastic Metal," is being made by the J. Richards Plastic Metal Company, of Charlotte street, Birmingham. In general outward appearance it resembles some of the other varieties of white metal so largely used for lining bearings, but it has a remarkably close, hard texture and takes a good polish. Its special feature, however, is its great affinity for other metals, this affinity enabling it to be readily "pasted on" with a plumber's soldering iron, it being impossible when it is thus attached to remove it by abrasive force. As it fuses at about 450° F., it can be readily melted in an iron ladle over an ordinary fire, while it is stated that it contains neither lead nor spelter, and that it is not deteriorated by remelting. The ease with which it can be applied renders this metal peculiarly applicable for effecting repairs in the colonies, &c., where casting furnaces are not available.

The defunct Roach line to Brazil is to be succeeded by a British line under the agency of Rusk & Jevons, the first of which, the Rubens, will sail July 2. This will establish direct correspondence with the River Plate and intermediate ports. There is a good probability that the enterprise will prove remunerative, as freights are likely to be maintained at paying rates. Is anybody foolish enough to suppose that British bottoms admitted as "free ships" under the American flag, would have endured the competition better than the American steamers which have now passed into the hands of the Pacific Mail Company? The thought is illusory.



SECTION OF HIGH AND LOW PRESSURE CYLINDERS THROUGH REHEATERS.—See page 1.

and Allegheny Railroads, who together carried the party 700 miles, contributed to make the meeting most successful and enjoyable. In conclusion, we will present in our next issue abstracts of the most important papers presented and read, either in full or by title, besides those already referred to.

Removing tolls on West-bound freights on the Erie Canal has increased the transporta-

some thirty years ago, by General Harvey, and the subsequent investment of a large amount of capital for their development, twelve years later, by John H. Cheever, of this city, and H. F. Durant, of Boston, that their great value was thoroughly developed. At the time mentioned the now famous Tilly Foster mines were incorporated, from which have been raised over 350,000 tons of prime Bessemer ores, and are still producing some 200 tons per day.

2000 feet long. There is also being sunk at the "Theall" a shaft 10 x 20 feet, which is now 75 feet deep. From this shaft it is intended to run an additional level and have the ore stoped out. The "McCullum Shaft" has also been liberally developed, having been sunk over 150 feet. The improvement in buildings and appliances here are on the same extensive scale as at the tunnel and reflect great credit on the manager. The following analysis of ores taken from

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WROUGHT IRON WITH BRASS SPRINGS.

Packed with Screws.



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2 1/2 inch, No. 301.....	\$3.60	2 1/2 inch, No. 311.....	\$7.20
3 " No. 303.....	4.40	3 " No. 313.....	8.80
4 " No. 305.....	6.75	4 " No. 315.....	13.50

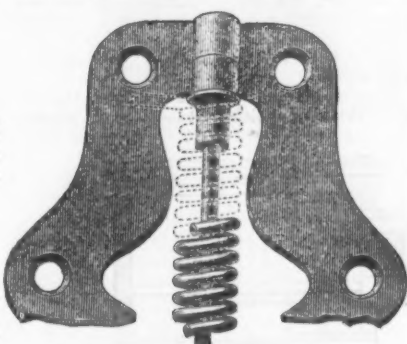
WROUGHT BRASS.

SINGLE JOINT.		DOUBLE JOINT.	
	Per doz. Pairs.		Per doz. Pairs.
2 1/2 inch, No. 1.....	\$3.00	2 1/2 inch, No. 7.....	\$6.60
3 " No. 3.....	4.50	3 " No. 9.....	8.30
5 " No. 5.....	7.50	5 " No. 11.....	16.50

SCOVILL MANUFACTURING CO.,

WATERBURY, CONN.

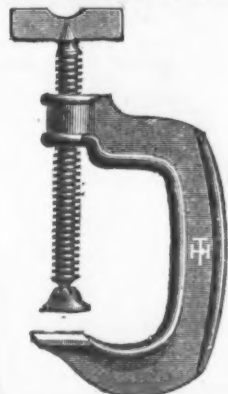
Depots: 419 & 421 Broome Street, New York.
177 Devonshire Street, Boston.
183 Lake Street, Chicago.



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Patented Articles of MALLEABLE IRON.

NEW pattern Heavy Screw Clamps; strongest in the market.



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Hammer's Malleable Iron Hand Lamps, 3 sizes.
Hammer's M. I. Hanging Lamps.
Hammer's Adjustable Clamps.

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MALLEABLE IRON CASTINGS
Of superior quality, and Hardware Specialties in
Malleable Iron made to order.
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Branford, Conn.

ESTABLISHED 1838.

Corner Irons,
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Clip Yokes,
Slat Irons,
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Joint Ends,
Felloe Plates,
Saddle Clips,
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Couplings,
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Screws,

C. COWLES & CO.,
Manufacturers of
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SCREW
PLATES,

AND OTHER
BLACKSMITHS' TOOLS.

The Morris Sash Lock Mfg. Co.,
Manufacturers of
The Morris Sash Lock,
Pat. Combined Sash Lift & Lock,
Pat. Self-Locking Shutter Bar,
And specialties in Builders' Hardware.
214 and 216 ELM STREET, CINCINNATI, OHIO, U. S. A

EXCELSIOR LAWN MOWER



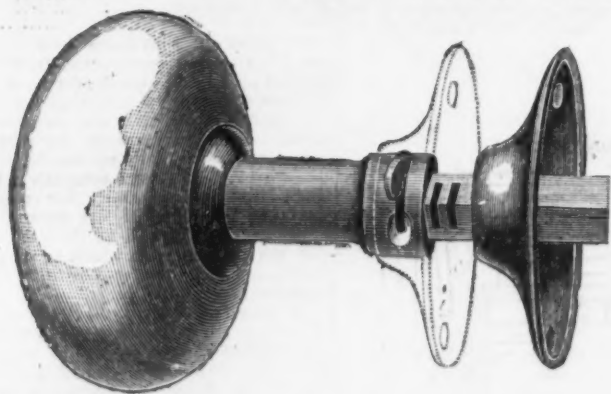
We make Seven Sizes of Roller Mowers and Six Sizes of Side-Wheel Mowers. We claim for our Mowers

Perfect Work, Light Draft and Simplicity.

We have received many first premiums in competitive trials with other Mowers, both in this country and abroad. We have special patterns of Mowers for export, meeting the requirements of every market. Our new Horse Mower is conceded to be the Lightest and Best Horse Lawn Mower ever made. N. B.—Horse and Hand Lawn Mowers are alike guaranteed in all respects. Send for Illustrated Catalogue. Address

CHADBORN & COLDWELL MFG. CO.,
Newburgh, N. Y.

IMPROVED FASTENING FOR



DOOR KNOB SPINDLES.

Patented May 21, 1872.

The above cut represents an important improvement for securing the Door Knob neatly and securely on the spindle without the use of screws. Architects, mechanics and dealers pronounce this device superior to anything of its kind in the market. In fact, no first-class Door Knob is complete without it. No extra cost to dealer or consumer.

Manufactured only by

THE CLARK MFG. CO.

Buffalo, N. Y.

BAGNALL & LOUD,
BOSTON, MASS.,

Sole Manufacturers in U. S. A. of our Celebrated

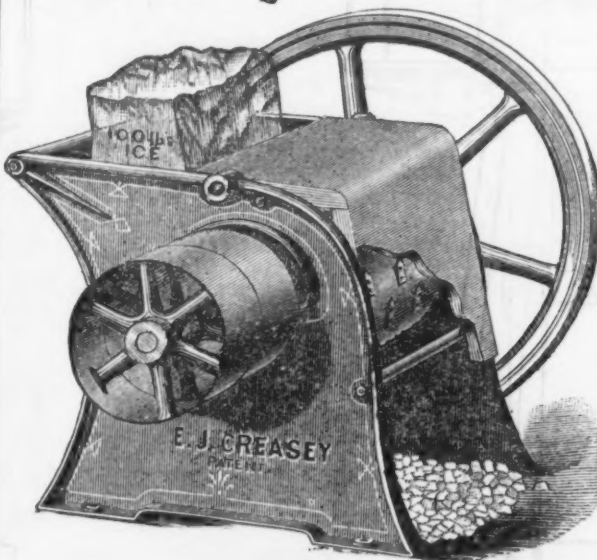
METALINE
AND

Star Roller Bush
Tackle Blocks.

Send For Illustrated Catalogue.
New York Warehouse, 33 South St.



Creasey's Ice Breaker.

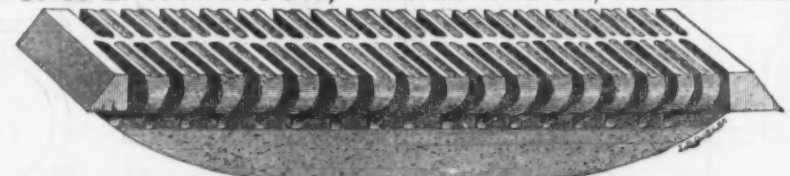


In Use by
MEAT & FISH
Packers,
ICE CREAM
Makers,
HOTELS
AND
CONFECTIONERS.
FIVE SIZES.
Saves Time, Money
and Labor.

Send for Circular to

JOS. S. L. WHARTON, 15th and Wood Sts., Phila.

J. S. L. WHARTON, 15th and Wood Sts., PHILADELPHIA.

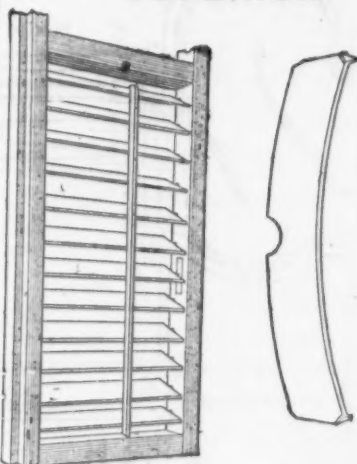


Manufacturer of MAITLAND'S PATENT GRATE BAR.
CLAIMS—Increased air space, hence more thorough combustion and saving of fuel; less liability of warping; one bar fills space of four ordinary bars and weighs less in proportion. Send for price.

BENTLEY'S Perfect Blind Slat Holder.

Patented.

SUPERIOR TO ALL OTHERS.



For tightening the Slats of Window Blinds and holding them at any required angle.
The sunlight is let in or shut out at will.
The blinds are made a much better protection from cold, because when the slats are shut they are so kept by the Holder and cannot be moved by the action of the wind. Noisy rattling of the slats is prevented. The holder is securely held by its spring and the sharp points at each end. As it is made of brass it will not rust. It cannot get out of order. Its superiority over other holders is evident.
It requires no screws or nails to fasten it to the blind. Any one can apply it. It cannot get loose or deface the blind as others do.

Retail Prices.

No. 1, For Outside Blinds, 5 cents each; 50 cents per dozen.
No. 2, For Inside Blinds, two for 5 cents; 25 cents per dozen.
At which prices samples will be mailed postpaid.

Trade Prices.

No. 1, \$6.00 per gross; discount 50 per cent.
No. 2, \$3.00 per gross; discount 50 per cent.

FOR SALE BY THE TRADE.

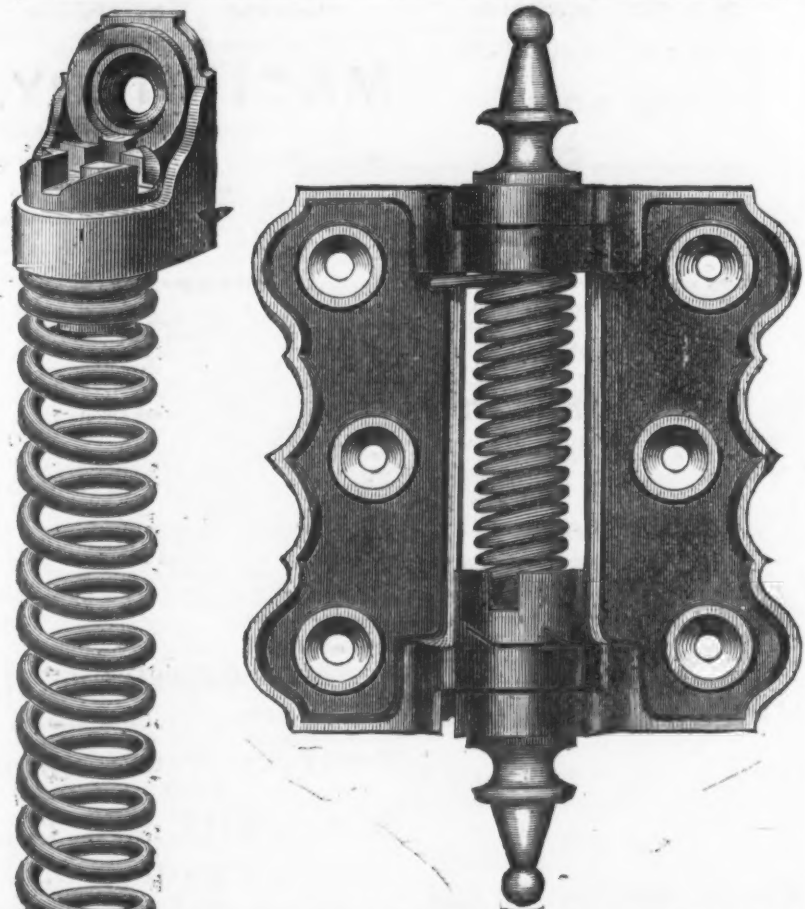
In case your jobbing house cannot supply you, orders will be promptly filled by

R. W. BENTLEY, Sole Manufacturer,
41 FOURTH ST., BROOKLYN, E. D., N. Y.

THE AMERICAN MACHINE CO.,
MANUFACTURERS OF

HARDWARE SPECIALTIES.

Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 128 Chambers St., New York.
SPECIALTIES: Fluting Machines, Hand Fluters, Plating Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.



STANDARD CLARK'S NEW Door Spring and Spring Butt.

(CUTS ARE FULL SIZE.)

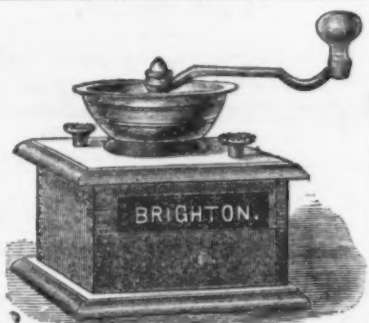
The Simplest, Cheapest and Best in Use.

Require no special tool or wrench to tighten or release the tension; a nail or any thin piece of iron will do it. Prices and Samples on application.

MADE BY

THE CLARK HARDWARE CO.,
DETROIT, MICH.

LOGAN & STROBRIDGE,
NEW BRIGHTON, PA.
Manufacturers of
PATENT
Iron, Britannia, Brass, Plated,
and Covered Hopper
COFFEE MILLS.



Hand and Power
Corn Mills.
Housefurnishing
AND
Builders' Hardware, &c.



Send for Catalogue and Prices.

PHILADELPHIA SMELTING COMPANY, Limited,
S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.
GENUINE BABBITT,
Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years
DEOXIDIZED BRONZE,
Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA, October 4, 1879.
GENTLEMEN: After a trial of eighteen months of your "Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.
Very truly,
HENRY DABSTON & SONS.

Stanley Rule & Level Co.,
MANUFACTURERS OF
**Improved
Carpenters'
Tools.**



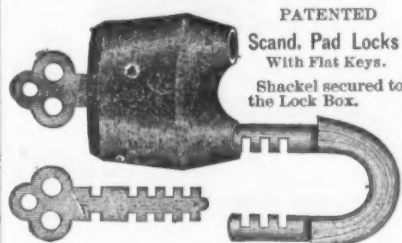
Manufacturers of Bailey's Patent Adjustable Planes.
General Agents for the sale of Leonard Bailey & Co.'s "Victor Planes."
Manufacturers of "DeLancey" Patent Adjustable Planes.

FACTORIES,
New Britain, Conn.
WAREHOUSES,
29 Chambers St.,
New York.

STAR LOCK WORKS.

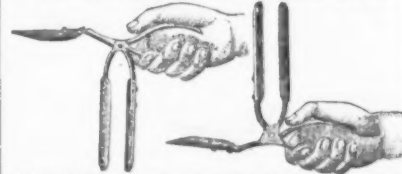
ESTABLISHED 1836.

Trunk Locks, Door Springs,
Pad Locks, Trunk Stays,
Dead Latches, Keys, &c., &c.
110 South 8th St., and Sansom, bet. 8th
and 9th, PHILADELPHIA.



HILLEBRAND & WOLF.

FLORICULTURAL IMPLEMENTS.



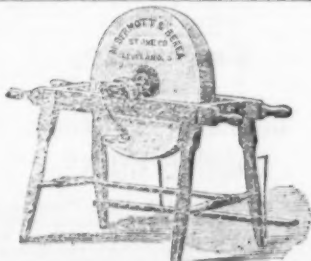
Very attractive and convenient for weeding, trans-
planting and cultivating. Send for circular and price
list.
J. M. JONES, Palmyra, N. Y.

Grindstones, Emery, &c.

Walter R. Wood,
GRINDSTONES.
Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of
OIL STONE

Of all description.
107th Street and Harlem River,
Send for Illustrated Price List. NEW YORK.



McDERMOTT & BERA STONE CO.,
Manufacturers of
GRINDSTONES,
Cleveland, Ohio.

OHIO GRINDSTONE COMPANY,
Manufacturers of

GRINDSTONES
Of All Kinds.

127 Superior Street,
CLEVELAND, OHIO.

LOMBARD & CO.,
Importers and Dealers in
GRINDSTONES,
Cor. Lewis Wharf & Atlantic Ave., Boston.

Stones for Machinists, Carpenters, Farmers and
Glass Cutters constantly on hand and cut to order.

OHIO GRINDSTONES.

Superior Ohio Grindstones, manufactured by
P. L. Cole, Constitution, Ohio, will be supplied to
the Southern trade at lowest possible rates by
S. B. LOWE, Southern Agent,
Chattanooga, Tenn.

We offer you until further notice,
**OUR HARD TIMES CHALLENGE
EMERY WHEEL,**

at the prices and in the sizes given below. This
Wheel is of a special grade, made for standard
use upon cast iron edging. It is fully war-
ranted to be, in all respects, as good a wheel
as any wheel made, and to stand as much
speed, and as much use and abuse as any
wheel made, excepting none. Try it, and spite of
your prejudice it will please you.
Terms, strictly cash, 30 days after shipment, and
in the meantime you may use the wheel free, and
WEAR IT OUT IF YOU CAN, AND
RETURN THE HUB FOR PAY.
16 inch x 3 inch... \$8.00 18 inch x 3 inch... \$11.50
16 inch x 2 1/2 inch... 10.50 18 inch x 2 1/2 inch... 14.50
16 inch x 3 inch... 11.50 18 inch x 3 inch... 17.50
No other sizes at proportionately low prices.

HEATON EMERY WORKS,
BALLSTON SPA, N. Y.

ALBANY, N. Y., March 25, 1881.
GENTS: We have carefully and thoroughly tested
the 3 x 16 Hard Times Wheel you sent us, and find
pleasure in pronouncing it a first-class wheel. Yours
very truly,
FERRY & CO.

ASHLAND EMERY CO.
CHARLES ALDEN, MANAGER.

Importers and Manufacturers of PURE
TURKISH EMERY
A. A. IRVINE & CO., Agents,
14 MURRAY ST., NEW YORK

Send for quotations and samples.

Office of PHOENIX CASTER CO.,

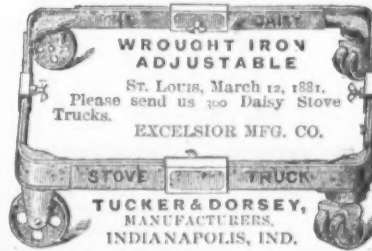
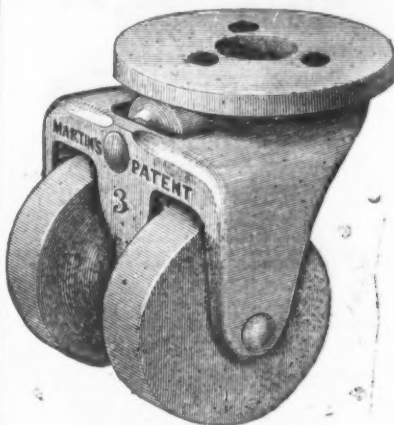
Indianapolis, Ind.

George A. Ruhleman & Co., St. Louis,
Mo., have sold our Casters as follows:
1878.....Amount, \$14.55
1879....." 246.76
1880....." 710.53

Our Caster is no experiment. The people
will have it, if it does cost more than the
shams on the market. Eight-inch Mill Files
are no better stock. Introduce yourself to
these goods by a very small stock order of
our selection. Terms, 60 days. Ship them
back if they fail in your esteem. Send for
catalogue.

PHOENIX CASTER CO.,

Manufacturers,
INDIANAPOLIS, IND.



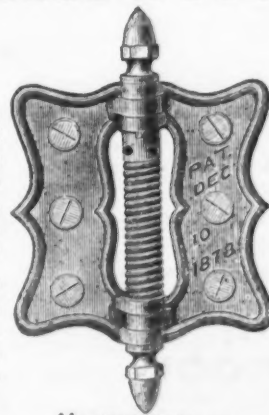
OFFICE OF
THE EDWARDS MANUFACTURING CO.,
Manufacturers of
SPRING HINGES & DOOR SPRINGS.

DETROIT, MICH.,
May 26, 1881.

To the Trade:

Please take notice, that we
claim that THE CLARK
HARDWARE CO., of this
city, are infringing upon our
patents in the manufacture
of a Spring Hinge which they
advertise as the "Standard."
That we have the sole right
(Patents 210,758 and 225,973)
to use Ratchet Teeth or Rad-
ial Grooves in gaining the
tension upon either Door
Springs or Spring Hinges.

We desire to notify you

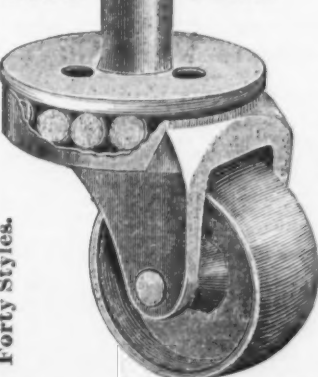


that we have ordered pro-
ceedings against The Clark
Hardware Company, and
shall be obliged to prosecute
anyone selling an infringe-
ment, either at wholesale or
retail.

Our purpose in sending
this notice is to save any pos-
sible feeling which the trade
might have if we should
bring suits and entail ex-
pense and trouble without
your notice of the circum-
stances.

Very Respectfully Yours,
THE EDWARDS MFG. CO.

Patent Anti-Friction
CAS TER.



PERFECT SASH LOCK.



Twenty Styles.
Agents:
Nashua Lock Co., Boston. S. G. B. Cook & Co., Baltimore

THE AMERICAN VENTILATOR
SOLD BY THE HARDWARE TRADE.



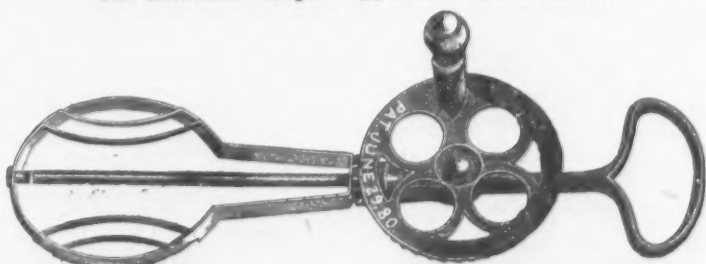
WHITE FOR PRICES.

THE AMERICAN VENTILATOR
is warranted to work high or low windows
easier than all other devices, and defies
competition, and only costs about one-
third as much as box frames and weights.

W. A. FORD,
PATENTEE AND MANUFACTURER.

O. P. SCHRIVER,
SOLE SUPPLY AGENT,
GREENSBURG, IND.

DAVID HYMES & CO.,
92 Church Street, New York,
Hardware Manufacturers' Agents,
And Sole Manufacturers of the
"ACME EGG BEATER,"
The Best and Cheapest Egg Beater in the Market.



Bargains in Hardware and Cutlery.
Low estimates made on all kinds of small castings in the rough, japanned or varnished.

Freight Rates on Iron from Pittsburgh.—The East-bound Trunk line classification has been modified as follows, taking effect June 9:

From Pittsburgh to	Seventh class.	Eighth class.	Iron.	Grain and flour per cwt.
New York.....	20	16 1/2	16	16 1/2
Philadelphia.....	18	14 1/2	16	14 1/2
Baltimore.....	17	13 1/2	15	13 1/2
Providence.....	25	21 1/2	23	21 1/2

It is now probable that the New Jersey Central Railroad Company, by a sale of valuable bonds in its possession, will soon be released from its receivership.

Special Notices.

J. SEIDEL,
COMMISSION MERCHANT,
Havana, Cuba. Box 662.

Will be happy to accept the representation of first-class houses manufacturing hardware. References on file at the office of the American Exporter, 86 Duane Street, New York.

Foundry for Rent.

The Western Malleable and Gray Iron Works, at Port Washington, Wisconsin, lately occupied by E. Schumacher & Sons, the largest and best furnished establishment of its class in the Northwest, are for rent for one year, and probably thereafter for a longer period, with chance to purchase.

Address: WILLIAM A. PORS,
Port Washington, Wis.

June 6, 1891.

Dixon's Lubricants.

Manufactured by the
DIXON CRUCIBLE COMPANY, JERSEY CITY.
Dixon's Belt Grease.
Dixon's Machine Grease.
Dixon's Perfect Lubricator.
Write for circular.

BREWSTER & PHELPS,
Dealers in Railway and Machinists' Supplies.
246 Clark St., Chicago.

L. SALOMON,
Importer of and dealer in
Upholsterers' Needles, Gilt Nails and
Housefurnishing Hardware.

Agent for the Champion and Standard Knox
Fluting Machines.
No. 10 Murray St., New York.

**LEIGH'S
DISCOUNT BOOK**
Acknowledged by all the best work of the kind ever
published. Price, by mail, One Dollar.
SPECIAL NOTICE.—This book will be cheer-
fully sent for examination or comparison to any
responsible house requesting it, and return postage
paid if book is not satisfactory.
A. LEIGH,
St. Louis Elevator, St. Louis, Mo.

NOTICE!

SPECIAL SALE OF

CUTLERY.

SEE ADVERTISEMENT ON PAGE 10

OF

BRADFORD & ANTHONY, Boston.

The Cornwall & Paterson Mfg. Co.,
Manufacturers of
SPECIAL MACHINERY, adapted to all kinds
of Light Metal Work.

Also DIES and PATTERNS made to order.
P. O. address, SAUGATUCK, CONN.
Factory: Westport, Conn.

**ENGINE AND BOILER
For Sale.**

6 x 15 Horizontal Engine in good condition; also,
75-Horse Power Boiler, Heater, Pump and all other
fixtures; all nearly new.

BEECHER & PECK,
Lock Box 128, New Haven, Conn.

To Exchange for Hardware.

The Ozment Fruit Farm, sixty acres, well im-
proved, good buildings and six thousand fruit trees.
Sale of strawberries alone pays expenses of the
place annually. Reason for selling satisfactory.
Address for particulars,
J. W. OZMENT,
La Grange, Texas.

DIE SINKER WANTED.

Must be a practical workman, capable of taking
charge of Die Sinking for Carriage Drop Forgings.
Address
STUEBAKER BROS. MFG. CO.,
South Bend, Ind.

WANTED—A situation as Shingler in a Rolling
Mill, by a man accustomed to doubling muck
and scrap iron. Strictly sober.
JEREMIAH MCCARTHY, McKeesport, Pa.

STEEL:

Its History, Manufacture, Properties, and Uses.
By J. S. JEANS,

Secretary of the Iron and Steel Institute.
Section I. History of Steel; Chap. 1. History of
Steel; 2. Early History in England; 3. Progress of In-
vention; 4. History of Bessemer Process; 5. Siemens-
Martin Process; 6. Other Steel-making Processes; 7.
Steel in America; 8. Germany; 9. France; 10. Austria;
11. Russia; 12. Sweden; 13. Other Countries.—Section
II. Manufacture of Steel; Chap. 14. Cementation and
other Methods; 15. Manufacture by Bessemer Pro-
cess; 16. Siemens-Martin Process; 17. Other Methods.
—Section III. Chemical and Physical Properties of
Steel; Chap. 18. Phosphorus in Steel; 19. The Use of
Manganese; 20. Spiegeleisen; 21. Sulphur in Steel;
22. Silicon in Steel; 23. Tensile Strength of Steel;
24. Mechanical Tests of Steel; 25. Analysis of Steel;
Section IV. Uses of Steel; Chap. 26. Application of
Steel to Railway Purposes; 27. To Shipbuilding; 28.
To Bridge Building; 29. To General Purposes; 30.
Guns and Armor Plates; 31. Other Purposes.
Price.....\$14.50
For sale by DAVID WILLIAMS, 83 Reade St., N. Y.

Special Notices.

PROPOSALS

For Lamps, Mineral Oil, Extra Parts
of Lamps, Wicks, &c., for the
U. S. Army.

DEPT. QUARTERMASTER'S OFFICE,
PHILADELPHIA, PA., June 7, 1891.

SEALED PROPOSALS IN TRIPPLICATE, SUBJECT
to the usual conditions, will be received at this
office, and at the office of each of the Depot Quar-
termasters at New York City, Jeffersonville, Ind., and
San Francisco, Cal., until 11 a. m. at this office, 12 a. p.
m. at New York City, 11 a. m. at Jeffersonville,
and 8 a. m. at San Francisco, on July 7, 1891, at
which times and places they will be opened in the
presence of bidders for furnishing and delivering
4000 Army Lamps and various extra parts and iron
brackets, and 60,000 gallons of Mineral Oil, having
flash point not lower than 125° Fahrenheit, the bids
from the Pacific Coast to be made for delivery at the
San Francisco Depot of such portion of the supplies
as may be required for the service on the Pacific
Coast (about one-sixth) and all other bids to be made
for delivery of the supplies (except oil) at either the
Philadelphia, New York, or Jeffersonville Depot only.
Bidders will state in what quantities they will make
deliveries, and how soon they will commence and
complete delivery of entire lot bid for.

The lamps, brackets and extra parts must be of
prescribed specifications, and patterns as shown in
drawings, and the oil must be of the standard herein
specified.

Proposals will be received for a less quantity of the
supplies than is required.

The government reserves the right to reject any or
all proposals, and to require delivery to be made at
whichever of the Depots named may be deemed most
advantageous to the public service.

A preference will be given to articles of domestic
production and manufacture, conditions of price and
quality being equal, and such preference will be given
to articles of American production and manufacture
produced on the Pacific Coast to the extent of the
portion of the supplies required by the public service
there.

Blank proposals and specifications, including the
number and quantities of the lamps of each kind re-
quired, extra parts, brackets, &c., and manner of
bidding, and any further information that may be
desired, will be furnished by either of the Depot
Quartermasters mentioned, on application.

Proposals should be addressed to either the Depot
Quartermaster at Philadelphia, New York City, Jef-
fersonville, or San Francisco, or be enclosed "Pro-
posals for Lamps," (or Oil, or whatever is bid for).

A copy of this advertisement and of the specifica-
tions should be attached to each bid and be mentioned
therein as forming a part thereof.

Each bid must be accompanied by a bond of the
form prescribed in the general instructions to the
bidders, and the bid will be accepted and the contract
for which he has bid be awarded him, he will enter
into a contract and bond agreeably to the terms of
his proposal within 30 days after date of award to
him of the contract.

D. H. RUCKER, Ass't Q. M. Gen., U. S. A.,
In Charge of Depot.

Wanted.

Traveling Salesman for the Northwest

to sell table and spring cutlery. One well ac-
quainted with the Hardware trade.
Address, PERKINS,
Box 1278, New York.

Wanted.

A second-hand Corrugating Machine in the shape
of rollers, with crank to be worked by hand. This
machine is required to corrugate iron for elevator
roofs, &c.
Address, with full particulars, CORNICE,
Office of The Iron Age, 83 Reade St., New York.

Wanted.

By a respectable young man, a position as Ship-
ping or Order Clerk, Packing or Porter, or in any
capacity where he can be usefully employed. He is
thoroughly posted in the General Hardware Busi-
ness, and can furnish the best of references.
Address, F. A. W.,
Office of The Iron Age, 83 Reade St., New York.

To Manufacturers and
Hardware Merchants.

WANTED.

By a man of experience in positions of trust,
who has a knowledge of the requirements of the
export trade in American Hardware, having re-
sided and traveled abroad for business, also held
for several years past a responsible position in a
manufactory, a man engaged as an office man or
traveler to solicit trade and establish connections in
foreign countries.
Address, ENTERPRISE,
Office of The Iron Age, 83 Reade Street, N. Y.

HEAVY IRON WORKS WANTED.

An Eastern Manufacturing Company, doing a profit-
able business in heavy wrought iron structures, the
manufacture and sale of which they control for the
United States and Canada, wish to establish additional
work, located in the West, South, Pacific Coast and
Province of Ontario. Must have first-class freight
advantages for receiving rolled structural and man-
ufactured iron. Address
WM. O. DOUGLAS, Binghamton, N. Y.

Wanted.

A competent man to take charge of a small blast
furnace. Must have a knowledge of chemistry.
Address,
WAMPUM IRON CO., LIMITED,
Wampum, Pa.

PARTNER WANTED.

Or For Sale,
A Good Pipe & Machine Foundry,

all complete, and in good working order. Foundry
brick, 115 feet by 90 feet, 25 feet high, 1 steam and
1 hand crane, 2 cupolas, 1 Root blower, good power,
pipe flasks and patterns, all in good order, with
large lot of machine patterns; pattern shop, 30 feet
by 75 feet; good office, 3 rooms. Reasons for sell-
ing, want of operating capital. For particulars
address,
D. GILES & CO.,
Chattanooga, Tenn.

Iron Shears Wanted.

Parties having Shears strong enough to cut 3/4
square iron cold, to dispose of, address with full
description, price, &c.
WOOD, SMITH & CO.,
Fort Plain, N. Y.

WANTED—A position to sell Hardware on
commission, through New England States and
Canada, in connection with other goods. Trade
already established. Start about Aug. 15. Best of
reference given. Address CHAS. F. HOAGLAND,
Dover, Morris County, N. J.

Hardware and Implement Dealers.
A most desirable agency for Threshers, Horse
Powers and Engines, can be had in all territory
not already occupied, by writing to
THE AULTMAN & TAYLOR CO., Mansfield, Ohio.
Correspondence solicited.
When you apply for agency, state where you
saw this advertisement.

Sanderson Bros. Steel Co.
A limited number of shares for sale by
EDWARD FEITH & SON,
441 Pearl Street, New York.

Special Notices.

SECOND-HAND
and NEW TOOLS.

June List No. 4.

1 Pit Lathe, 16 ft. swing by 30 in. face; has gear-
cutting attachment.
1 1/2 in. sw. 4 ft. bed Screw-cutting Lathe. New.
1 1/2 in. sw. 5 ft. bed Screw-cutting Lathe. New.
1 1/2 in. sw. 4 ft. bed Ser.-cut. Lathe. Gould; sd-hd.
1 1/2 in. sw. 5 ft. bed Ser.-cut. Lathe. Gould; sd-hd.
1 1/2 in. sw. 5 ft. bed Ser.-cutting Lathe. N. Y.
Steam Eng. Co. Second-hand.
1 1/2 in. sw. 5 ft. bed Ser.-cutting Lathe. Fitch-
burg. Second-hand.

Also the following new and improved Machin-
ists' Tools for future delivery:
1 1/2 in. sw. 7 1/2 ft. bed Ser.-cut. Eng. Lathe. July 1.
1 1/2 in. sw. 11 1/4 ft. bed Ser.-cut. Eng. Lathe. July 1.
1 1/2 in. sw. 12 ft. bed Ser.-cut. Eng. Lathe. Sept. 1.
1 1/2 in. sw. 16 ft. bed Ser.-cut. Eng. Lathe. Sept. 1.
1 1/2 in. sw. 16 ft. bed Ser.-cut. Eng. Lathe. Aug. 15.
1 Iron Planer to plane 3 ft. long 25 in. wide. Sept. 1.
1 Iron Planer to plane 7 ft. long 25 in. wide. Sept. 1.
1 Up. Drill, 26 in. sw., bk.-gd. and self fd. July 10.
4 Foot Lathes, 4 in. to 9 in. swing. Second-hand.
1 Hand Lathe, 7 to 30 in., different lengths.
Second-hand.

1 7-in. Shaper, Hewes & Phillips. Second-hand.
1 12 in. Shaping Machine, Oil make. New.
1 6 in. Shaping Machine, Heavy. Second-hand.
1 Lat Drill, from 11 in. to 25 in. Second-hand.
1 Pratt & Whitney Cam Cutter, 2 heads sd-hd.
1 Milling Machine, Lincoln pattern. Second-hand.
1 Manhattan Arms Co. Millers. Second-hand.
1 Phoenix Millers. Second-hand.
1 Face Milling Machine. Second-hand.
1 New 4 Spindle Drill Press.
1 Wall Drill, heavy. Second-hand.
1 Pratt & Whitney Screw Machine; sd-hd.
1 Screw Head Slicer. Second-hand.
1 Second-hand Profiling Machine.
1 3 ft. x 16 in. Bigelow Power Planer. Second-hand.
1 3 ft. x 12 in. Iron Planer. Second-hand.
1 3 ft. x 25 in. Iron Hand Planer. Second-hand.
1 Slitting Machine. Second-hand.
1 Power Hammer. Second-hand.
1 Steam Hammer, 11 x 16 cylinder. Second-hand.
1 Jeweler's Power Roller, 6 in. wide. Second-hand.
1 24 in. Power Roller. Second-hand.
1 Double-Acting Presses, for power. Nearly new.
1 Single-Acting Presses, for power. Nearly new.
1 125 Foot Presses. Nearly new.
1 12 in. x 22 in. Hand Planer. Second-hand.
1 Medium Power Punching Press. Second-hand.
1 Small Power Punching Presses. Second-hand.
1 Foot Punch, with bench. Second-hand.
1 Taft Power Shear, 4 in. blade. Nearly new.
1 Hand Shear. Second-hand.
1 Pulley Polishing Machine. Second-hand.
1 Horizontal Drilling Lathe, 24 in. swing, 10 ft. bed.
1 Bolt Outter, common old style. Second-hand.
1 Straightening Machine, wood-hd. Second-hand.
1 Upright Boring Bar, 4 1/2 in. diam., self-fd.; sd-hd.
1 Horizontal " 30 in. diam. self-fd.; sd-hd.
1 Bolt Pointing Machine. Second-hand.
1 Pulley Forming Machine. Second-hand.
1 Tumbling Barrels. Second-hand.
1 Richards' Indicator.
1 Cranes. Second-hand.
1 Extra Horizontal Engine. New.

1 Blue & Williams Planer and Lathe
1 Lot Drills, from 11 in. to 25 in. Second-hand.
1 Lot Drills, from 11 in. to 25 in. Second-hand.
1 Lot Drills, from 11 in. to 25 in. Second-hand.
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1 Lot Drills, from 11 in. to 25 in. Second-hand.

For sale low by

The Geo. Place Machinery Agency,

121 Chambers and 103 Reade Sts.,
NEW YORK.

For Sale.

**THE COLUMBIA FOUNDRY AND
MACHINE WORKS.**
Lot 220 ft. front, 125 ft. deep. Machine Shop
60 x 40, with Pattern Shop in second story, and
Smith Shop 34 x 28, with Engine and Boiler rooms
attached. Foundry 75 x 53, with two Cranes and
Brazing Furnace; Brick Buildings, slate roofs.
Also, one Frame Pattern Warehouse, 48 x 28, slate
roof. Drawings and Patterns for Blast Furnace
and Rolling Mill work, Gas Works, Sugar Apparatus,
Steam Engines and Machinery. Works estab-
lished 1873, New Sheds 1877. Shipments over com-
peting Railroads. Undersigned have run the
works continuously since 1870, and are doing a
good business. Sale solely to dissolve partnership.
PERROTET & HOYT,
Columbia, Pa.

For Sale.

Stock of hardware, stoves and implements, and
store furniture, in one of the best towns in Kansas.

Address,
Box 366, Salina, Kansas.

NUT AND BOLT MACHINERY

For Sale.

Second-hand Lewis, Oliver & Phillips Header.
Pratt & Whitney Tire Blank Header.
Also, over ONE HUNDRED different sizes
and patterns of Bolt Cutters, Tappers, Nut
Machines, &c.
The only Specialists in this line in the United
States.
Patentees and owners of the celebrated National
Bolt Cutters.

NATIONAL MACHINERY CO.,
Cleveland, O.

For Sale.

The Little Schuylkill Rolling Mill,
at Milldale, Schuylkill County, Pa., near Port Clinton,
on the line of the Philadelphia and Reading
Railroad, consisting of a Merchant Bar Mill in
complete running order, with a splendid water
power sufficient to run the mill two-thirds of the
year. Engines, Boilers, Foundry and Machine
Shop, with Lathe for turning rolls, and all other
appurtenances necessary to commence operation
at once. Together with dwellings, stables and
large tract of land, to be sold low if applied for
soon. For further particulars address or apply to
J. O. RICHARDSON,
No. 232 Dock street, Philadelphia.

For Sale.

One Pair Rail Shears,
10 by 12 vertical engine, with knives and governor
complete. New and never used except to make
through test.
Address,
A. M. ROBBINS,
New Castle, Pa.

TO CAPITALISTS.

FOR SALE.

A Rolling Mill and Nail Factory, located on the
Pennsylvania Railroad, in the iron and coal region
of Pennsylvania, will be sold to close out an estate.
The works have a capacity of 500 tons per annum,
are now in first-class running order, and have all
ways done a successful business.
Address,
ADMINISTRATOR,
Office of The Iron Age, 83 Reade St., New York.

Special Notices.

TO IRON MANUFACTURERS.

For Sale.

The Rolling and Puddling Mills of the late Hud-
son River Iron Co., at Poughkeepsie, N. Y. These
mills, with all the land west of the New York Central
and Hudson River Railroad tracks and a large
river front, are for sale. The mills are in good con-
dition for immediate occupancy. They contain all
the machinery necessary for the manufacture of
Merchant Iron, Rail and Bolt Spike, Bolts, &c., &c.
A large portion of the purchase money may remain
on the property. Parties in search of this kind of
property are invited to examine it, and for other
particulars to address
W. S. JOHNSTON, Trustee,
Poughkeepsie, N. Y.

FOR SALE.

The Outfit of a Pistol Factory.

For full details see special advertisements on
page 20 of The Iron Age of May 12.
Address,
J. I. CLARK,
609 Tamarind street,
Philadelphia, Pa.

For Sale.

Ten Double Acting Power Punching Presses,
At order. Eight Single Acting Power Punching
Presses. At order. Most of the double acting
presses are the No. 3 Waterbury Press; the single
acting, No. 2. One large Bliss & Williams Punch-
ing Press. One hundred and twenty-seven Foot
Presses in A order, most of them square sided.
Address, THE GEORGE PLACE MACHINERY
AGENCY, 121 Chambers and 103 Reade Sts., N. Y.

HARDWARE STOCK

FOR SALE.

A complete stock of Hardware and store fix-
tures, including about \$7000, located at Cincinnati,
in a good business locality, and now doing a fair
trade. Address,
HARDWARE,
Office of The Iron Age, Builders' Exchange,
Cincinnati, Ohio.

TWO LOCOMOTIVES FOR SALE.

Both of standard gauge and in good running
order. No. 1, cylinder 30 x 22, four drivers, 34 in.
diam.; weight, 28 tons; but little worn; made at
the Baldwin Works, Philadelphia. No. 2, cylinders
24 x 22, four drivers, 60 in. diam.; weight, 24 tons;
patent air-brake. Address Box 87, Bordentown,
New Jersey.

For Sale.

Bolt Header and Rivet Machine.
Bement Turret Lathe.
18 in. x 12 ft. Engine Lathe.
18 in. x 18 in. x 1/2 ft. Planer. Bement.
Boring Lathe. 18 in. Planer.
4 Column Drills, Planer Centers, &c.
A. G. BROOKS & WINEBRENER,
261 N. 3d St., Philadelphia.

For Sale.

Second-Hand Engine & Boilers,

Portable rigs, from 4 x 10 cylinders to 9 x 12. Also
Stationary Boilers, from 10 to 30 horse-power. A
large quantity of Engines from 6 x 10 to 9 x 12 cyl-
inders, all in good repair. Second-hand Pipe of
every description.
YOUNG & LOCKE, Titusville, Pa.

For Sale.

One of the most improved patent rights in
Breech-loading Fire Arms. A good working model
can be seen or particulars sent on application to
CHAS. FOEHL,
547 New Market St., Philadelphia, Pa.

For Sale.

A Ten (10) ton Mackenzie Cupola and Mackenzie
Fan in best condition. Address
NAT. BUREAU OF ENGRAVING & MFG. CO.,
Burlington, N. J.

Hardware Store and Roofing Business

For Sale,

Near N. Y. City. Thriving and growing place.
Good stock Machinery, Tools, &c.; fine store.
Address, HARDWARE STORE,
Office of The Iron Age, 83 Reade St., New York.

Hardware Stock and Store For Sale in

Southern Illinois.

Stock from \$5000 to \$8000. Sales nearly \$30,000
last year. Failing health the cause of selling out.
This is a rare chance and will pay investigation.
Address, ILLINOIS,
Office of The Iron Age, 83 Reade St., New York.

A Superintendent of Blast Fur-

naces and Rolling Mills,

Thoroughly acquainted with the English, Scotch
and American Pig and Wrought Iron trades; also,
with the foreign and home iron ore business, hav-
ing a knowledge of chemistry, is desirous of rep-
resenting a first-class commission house in the iron
trade on the East Coast.
Address,
Office of The Iron Age, 83 Reade St., New York.

Commercial Travelers, Attention!

Your services are desired to introduce to the
trade the Frise Lemon Squares. Entirely new
and superior principles. Requires little power,
is non-corrosive and durable, producing juice free
of rind oil. Special Terms. Samples sent by ex-
press on receipt of \$1.00.
A. B. DEMING, Agent, 43 Murray St., N. Y.

Blast Furnace Manager

Of many years' experience in the management of
blast furnaces in England and in the United States,
will shortly be open to an engagement. Unexcep-
tionable references.
Address, MANAGER,
Office of The Iron Age, 83 Reade St., New York.

HARDWARE BUSINESS.—For Sale, stock and

fixtures of a first-class Hardware and House-
furnishing Store in a thriving town of 6000 inhabi-
tants. Northern New York. Only reason for sell-
ing, other business prevents owner from giving it
attention. Established 8 years. Will be sold for
the cash value of stock. No charge for good will.
Part cash; balance in unencumbered real estate
near New York City.
For full particulars address J. H. WY,
Office of The Iron Age, 83 Reade St., New York.

TO MANUFACTURERS OF WOOD-WORKING

Machinery, Mill or Engineers' Supplies. We
are prepared with a large established trade to
represent parties in above lines at St. Louis, Chi-
cago or New Orleans, either as agents or purchas-
ers, at jobbing prices. Early correspondence
solicited.
CURTIS & CO. MFG. CO.,
811 to 819 N. Second St., St. Louis, Mo.

Special Notices.

New and Second-Hand

MACHINERY.

One Horizontal Engine, 15 1/2 in. x 30 in. Todd & Raf-
ferty.
One Horizontal Engine, 3 in. x 12 in. Erie Iron Works.
One Horizontal Engine, 3 in. x 16 in.
One Beam Corliss Engine, 500 H. P.
Portable Engines from 10 to 25 H. P.
Two Horizontal Return Tub. Boilers, 100 h. p. each.
One Horizontal Return Tub. Boiler, 100 h. p. each.
One Horizontal Return Tub. Boiler, 100 h. p. each.
Two Hor. Tub. Boilers, 4 1/2 ft. x 13 1/2 ft., 4 in. tubes
One Locomotive Steel Boiler, 30 h. p.

MACHINISTS' TOOLS.

One Lathe, 24 in. x 13 ft.
One Upright Drill, 22 in. Pond.
One Milling Machine, Pratt & Whitney.
One Milling Machine, Wood & Light.
One Tapping Machine, 5 in. Saunders' Sons.
One Tapping Machine, 1 1/2 in. Saunders' Sons.
One Hydraulic Press, 8 inch ram.
One 300-ton Hydraulic Press and Pump
One Steamboat Blower, No. 2.
One Knowles Special Pump, No. 7.
One Bliss & Williams Foot Press.
One Peck, Stow & Wilcox Foot Press.
A large stock of Shaving, Pulleys, Hangers and
Miscellaneous Machinery,
One Upright Drill, 25 inch.
One Burleigh Rock Drill, No. 4. New.
One Hotchkiss Compressed Air Hammer.
Fifty Wrought Iron Vises, all sizes.
One Daniels Planing Machine.
Three pair Fairbanks' Scales, 2500 lbs. each.
One Pair Cutting Machine.
One pair Paper Rolls.
One Lathe, 14 in. x 6 ft., screw-cutting.
One Bogardus Mill, No. 2.

J. GRAY'S MACHINERY DEPOT,
37 Dey Street, New York, U. S. A.

Having Purchased the

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending June 14, 1881:

Dutch West Indies.		Havre.	
Quin. Val.	Copper, cks., 156 \$46,000	Quin. Val.	
Palm, gals., 649 \$80	Hdw. cs., 18 150	Palm, gals., 649 \$80	
Dutch East Indies.		French West Indies.	
Palm, gals., 245,599 \$9,450		Sew. mach., cs., 95	
Hamburg.		Palm, gals., 6,000 800	
Hdw. cs., 124 4,332		British Guiana.	
Sew. mach., 772 22,335		Palm, gals., 516 1,198	
Compass, cs., 2 139		New Zealand.	
Clocks, bxs., 131 1,806		Mf. iron, pkgs., 37 370	
Ag. imp., pkgs., 36 1,656		Tacks, cs., 5 820	
Mach. y., pkgs., 17 2,819		Cutlery, cs., 11 250	
Mf. iron, pkgs., 176 2,275		Ag. imp., pkgs., 107 3,537	
Palm, gals., 455,300 37,500		Mach. y., pkgs., 4 444	
Bremen.		Palm, gals., 64,513 8,875	
Palm, gals., 745,600 60,000		Sew. mach., cs., 15 480	
Ag. imp., pkgs., 150 1,205		Wigs, rolls, 12 339	
Hdw. cs., 3 54		Nails, pkgs., 12 339	
Mach. y., cs., 3 54		Pumps, pkgs., 3 165	
Pig iron, cs., 7 150		Clocks, pkgs., 149 1,650	
T. writers, bk., 175		Nails, cs., 20 470	
Mach. y., cs., 1 75		Wire, gds., cs., 25	
Antwerp.		Hdw. pkgs., 573 14,595	
Hdw. cs., 11 270		Cuba.	
Nails, bxs., 5 203		Spikes, pkgs., 261 827	
Mach. y., cs., 3 90		Mf. iron, pkgs., 176 3,055	
Arms, cs., 1 150		Ag. imp., pkgs., 118 1,806	
Gothenburg.		Pig iron, tons, 20 500	
Palm, gals., 174,296 13,195		Pumps, pkgs., 6 887	
Stockholm.		Hdw. cs., 93 1,577	
Palm, gals., 106,773 8,093		Mach. y., cs., 113 6,765	
Wiborg, Russ.		Nails, pkgs., 101 593	
Palm, gals., 69,027 5,790		Palm, gals., 940 1,286	
Christiansand.		I. safe, cs., 14 390	
Palm, gals., 130,418 10,035		Cutlery, cs., 14 390	
Lillestrand.		Sew. mach., cs., 17 1,079	
Palm, gals., 130,453 11,080		Wire, gds., cs., 25 1,000	
Odessa.		Unsettled States of	
Palm, gals., 166,630 20,000		Lombia.	
Amsterdam.		Hdw. cs., 377 7,941	
Hdw. cs., 6 75		Palm, gals., 703 9,921	
Stettin.		Arms, cs., 42 3,997	
Palm, gals., 134,114 10,729		Palm, gals., 880 595	
Rotterdam.		Nails, pkgs., 31 138	
Mach. y., cs., 4 200		Sew. mach., cs., 433 9,927	
Clocks, bxs., 49 333		Steel, bds., 92 466	
Hdw. cs., 2 127		Sheet lead, ris., 3 100	
Pumps, pkgs., 9 1,177		Nails, cs., 13 151	
Mf. iron, pkgs., 11 419		Cutlery, pkgs., 204 6,764	
Glasgow.		Mf. iron, pkgs., 426 4,754	
Sew. mach., cs., 168 2,170		Clocks, bxs., 17 290	
Hdw. cs., 20 590		Ag. imp., pkgs., 18 809	
Sheets, cs., 1 110		Pistols, cs., 8 943	
Mach. y., cs., 35 10,300		Carbines, cs., 4 375	
Mf. iron, pkgs., 14 254		Mach. y., pkgs., 71 2,357	
Ag. imp., pkgs., 5 339		Copper, bxs., 7 114	
Clocks, pkgs., 51 8,595		Lisbon.	
Exeter.		Cartridges, cs., 1 125	
N'lth, gals., 131,371,000		Hdw. cs., 13 171	
Liverpool.		W. mills, pkgs., 16 589	
Sew. mach., cs., 272 3,542		China.	
Brass, pkgs., 135 12,000		Rifles, case, 1 150	
Mf. iron, pkgs., 3 150		Constantinople.	
Clocks, bxs., 48 6,217		Palm, gals., 295,330 33,953	
Pumps, pkgs., 8 175		Trieste.	
Hdw. cs., 81 2,824		Palm, gals., 743,632 59,793	
Mach. y., pkgs., 45 7,012		Porto Rico.	
Ag. imp., pkgs., 29 790		Nails, pkgs., 207 667	
Steel, bxs., 2 100		Clocks, bxs., 20 223	
Br. goods, cs., 5 313		Sew. mach., cs., 6 214	
Rifles, cs., 100 21,590		Mf. iron, pkgs., 3 175	
Elsinore.		Wood, pkgs., 132 223	
Palm, gals., 239,781 19,272		Hdw. pkgs., 81 1,805	
London.		Mach. y., pkgs., 544 6,444	
Clocks, pkgs., 205 5,774		Mach. y., pkgs., 9 2,880	
Ag. imp., pkgs., 100 2,370		Havre.	
Mf. iron, pkgs., 6 150		Nails, pkgs., 118 406	
Pumps, pkgs., 20 139		Nails, bxs., 31 82	
Rifles, cs., 100 21,590		Carriages, cs., 4 3,575	
Hdw. cs., 47 13,017		Steel, pkgs., 37 81	
Sew. mach., cs., 475 8,350		N. R. bars, cs., 109 428	
Palm, gals., 80,077 71,446		Palm, gals., 480 5,927	
Cartridges, cs., 2 210		Lead, pkgs., 28 338	
Ore, sacks, 20 800		Cutlery, cs., 2 146	
Hull.		Mf. iron, pkgs., 39 141	
Mf. iron, pkgs., 11 254		Sew. mach., cs., 16 549	
Ag. imp., pkgs., 40 1,372		Mf. iron, pkgs., 3 175	
Clocks, cs., 8 150		Iron, bds., 3 8	
Bristol.		Hdw. pkgs., 5 171	
Hdw. cs., 11 293		Palm, gals., 176,000 20,440	
Mach. y., cs., 2 150		Mexico.	
St. Louis.		Ag. imp., pkgs., 69 765	
Palm, gals., 124,730 11,706		Arms, pkgs., 16 5,120	
Belmont.		Nails, pkgs., 126 3,300	
Palm, gals., 286,834 24,500		Nails, cs., 30 168	
Canada.		Revolvers, cs., 2 125	
Mach. y., cs., 14 251		Per. caps., cs., 10 617	
Marcellus.		Palm, gals., 120 166	
Mach. y., cs., 4 3,000		Hdw. pkgs., 161 8,495	
Palm, gals., 184,191 16,440		Clocks, bxs., 16 249	
Bordeaux.		Sew. mach., cs., 31 4,654	
Copper, cks., 225 45,000		Mf. iron, pkgs., 184 1,079	
Rouen.		Cutlery, pkgs., 59 1,668	
N'lth, gals., 600,600,000		Pumps, pkgs., 10 321	
British North American Colonies.		Pistols, cs., 1 27	
Palm, gals., 116 111		Mach. y., pkgs., 9 633	
Mach. y., pkgs., 8 450		Central America.	
Mf. iron, pkgs., 4 1,500		Cutlery, bxs., 2 27	
Iron ore, tons, 367 1,742		Hdw. pkgs., 4 27	
Hdw. cs., 20 313		Mf. iron, pkgs., 3 36	
Sew. mach., cs., 3 104		Nails, pkgs., 3 16	
Clocks, cs., 1 114		Sheet iron, bds., 2 20	
British Possessions in Africa.		Wire, ton, 1 200	
Carbines, cs., 1 57		Venezuela.	
Nails, pkgs., 103 209		Hdw. pkgs., 29 358	
Clocks, bxs., 10 205		Nails, pkgs., 29 72	
Hdw. cs., 161 1,816		Ag. imp., pkgs., 3 38	
Mach. y., cs., 36 1,280		Clocks, pkgs., 5 79	
Palm, gals., 48,500 4,500		Mf. iron, pkgs., 4 150	
Rifles, case, 1 27		Mf. iron, pkgs., 4 150	
Ag. imp., pkgs., 192 4,500		Mf. shoes, kg., 150 600	
British West Indies.		Clocks, cs., 107 1,830	
Palm, gals., 17,000 1,154		Argentine Republic.	
Boiler, cs., 1 125		Ag. imp., pkgs., 513 8,510	
Cartridges, cs., 3 75		Palm, gals., 20,000 2,500	
Ag. imp., pkgs., 13 43		Palm, gals., 16,000 2,555	
Mach. y., pkgs., 3 83		Nails, bxs., 15 80	
Hdw. cs., 2 127		Nails, pkgs., 20 175	
Nails, pkgs., 82 200		Mach. y., pkgs., 28 4,097	
Revolvers, cs., 14 318		Sew. mach., cs., 17 575	
Sew. mach., cs., 1 148		Horseshoes, kg., 54 250	
Mf. iron, pkgs., 151 348		Sandwich Islands.	
Oporto.		Hdw. pkgs., 202 25,646	
Clocks, cs., 21 324		Mf. iron, pkgs., 118 6,250	
Alexandria.		Palm, gals., 16,000 2,555	
Palm, gals., 301,050 33,600		Nails, bxs., 15 80	
Bilbao.		Nails, pkgs., 20 175	
Palm, gals., 181,617 23,230		Mach. y., pkgs., 28 4,097	
Palma.		Sew. mach., cs., 17 575	
Palm, gals., 177,119 17,000		Horseshoes, kg., 54 250	

COAL.

Reports from the wholesale dealers and operators this week are somewhat varied, though by common consent it is admitted that, taking the trade all through, it is not satisfactory. The Pennsylvania Coal and principal Lehigh companies are doing a good steady business, while in some other quarters business is spoken of as dull, orders backward, &c., for the reason that consumers

order only as necessities demand. One of the largest Eastern shippers says their business all along has been about the same as one year ago. There has been no "stocking up," however, and the belief is commonly expressed that when the start really begins, there will be a rush. The bear, after long hibernating, becomes voracious. The demands of the Western trade are constantly increasing, while it is surmised in some quarters that the Eastern demand may have reached its maximum for a considerable period to come. The blowing out of a score or more of furnaces may have an appreciable effect for the time being. In this connection, the merging of the New Jersey Midland and connecting railroads has a certain degree of significance, the ultimate object being a new route to the Coal fields, with outlets on the lake at Erie and Buffalo, from which a great Coal business may be developed.

Anthracite is quoted as heretofore—\$3.90 for Grate and Lump; \$4.05 for Egg; Stove, \$4.20; Chestnut, \$3.90, for most descriptions. Lehigh—\$5 to \$5.25 for Lump; \$4.25 to \$4.45 for Grate, Egg and Stove; \$4 for Chestnut. Bituminous remains as for months past, with animation, at \$4.85. Vessels are scarce. To Boston the rate is \$1.20; Portland, 90¢, and discharged; Providence, 75¢; New Haven, 60¢.

PHILADELPHIA.

Office of The Iron Age, 320 South Fourth St., PHILADELPHIA, June 14, 1881.

Pig Iron.—The market is unsettled and feverish, with some indications of a reaction from the dullness and apathy of the past 30 days. Prices are not by any means settled, however, quotations being almost as numerous and various as brands. The most prominent companies appear to be making a stand at \$24 for No. 1 Foundry and \$20.50 for Gray Forge, with possibly some slight concessions to buyers of lots of 500 tons and upward. Others vary as much as \$2 to \$2.50 per ton. A few choice brands bring \$25 to \$25.50, while others may be had at \$23 to \$23.50. The last named are chiefly outside lots, or from holders who are forcing sales in order to realize cash. Notwithstanding this irregularity, the market appears to have a healthy look, and it is believed that the requirements of consumers during the next 30 days will be sufficient to check the declining tendency and restore prices to a solid foundation. This would be predicated beyond doubt for the condition of the English market, which is too uncertain to admit of very confident predictions. Reports are current to-day that holders on the other side are asking more money, but buyers are incredulous, and not inclined to advance their bids on advice of that kind. While the reports of a reaction may be entirely true, there is a shade of suspicion that the market is being "rigged," so that lots of foreign iron may be unloaded. The furnacemen complain bitterly of the position they have been forced into. An unprecedented consumption is in progress, yet a large number of furnaces are entirely idle or working at a loss to their owners. This, it is claimed, is largely due to the coal combination and the high rates charged for freights. Work at the mines is restricted to about three days per week, so that the coal companies may obtain fictitious prices for their product, which may be all very well for them, but is disastrous to consumers. It is claimed that if miners were given full time, coal would be supplied to the furnaces at prices which would enable them to successfully meet competition from abroad, which, under present conditions, is absolutely impossible. It is certainly a curious condition of affairs, and one which may eventually result in killing the goose that lays the golden eggs. Sales of iron during the week have not been large, but there are a great many inquiries, and, as we have said, prospects of a heavy demand in the course of the next 30 days. Favorite brands of No. 1 Foundry command \$25 to \$25.50; ordinary, \$24 to \$24.50; Gray Forge iron, \$20.50 to \$22, with special rates to buyers of large lots.

Foreign Iron.—Bessemer is unsettled, but sellers claim to have withdrawn from the market. It is more likely that buyers cannot be found, unless at still lower prices, which may have had the effect stated, although for a different reason than the one alleged. In any case the demand appears to have been pretty well satisfied, as there is but little inquiry, and no bids which sellers are disposed to accept. Middlebrook iron is entirely nominal, \$17.50 to \$18 asked, but there is no demand. The same may be said in regard to Scotch iron, for which \$21 to \$23.50 is quoted as nominal prices.

Muck Bars.—The demand continues good, and desirable lots are quickly taken at \$38 to \$38.50 at mill. There appear to be more buyers than sellers at the inside quotation.

Blooms.—Are in active demand, and manufacturers are well sold up. Prices are steady and unchanged, say \$62.50 to \$65 for Cold-blast Charcoal; \$55 for Run-out Anthracite, and \$45 to \$47.50 for Scrap Blooms.

Coke.—Owing to the strike, it is difficult to give exact quotations, but, in some cases, we hear of \$1.65 being quoted, but sellers only accept orders for small lots until matters are adjusted at the ovens.

Bar Iron.—The outlook seems to improve, and under a brisk demand prices are firm. Without any specially large orders, manufacturers find themselves crowded with work, and are not inclined to increase their engagements, unless at full prices. After the midsummer holidays a still heavier demand is looked for, and consumers begin to realize that contracts at current rates are not likely to involve much risk, while delays in providing for their requirements may prove inconvenient. For large lots prices are firm at 2.35¢; the base price, 2.4¢, is generally obtained in case of smaller orders.

Structural Iron.—The remarks of last week would stand good on this occasion, as there is not the slightest change either in price or demand. Manufacturers are running full in most departments, and report a moderate inquiry for additional lots, with sales at 2.6¢ for Angles; 3¢ for Tees; 3.3¢ for Beams, and 3.4¢ for Channels.

Plate and Tank Irons.—The demand is very active, and buyers find it a matter of extreme difficulty to place orders. In some cases applications to half a dozen mills have been made, without finding a single one willing to bid on a 100-ton order. Prices, as may be expected, are very firm, although small lots may be had at quoted rates, say, 2.75¢ to 2.8¢ for Tank Iron; 3.25¢ for Refined Iron; 3.50¢ for Shell; 4.50¢ to 4.75¢ for Flange; and 5.50¢ to 5.75¢ for Fire-box.

Sheet Iron.—There is nothing whatever to notice in the way of change. Manufacturers are busy on orders; indications favor the expectation of a heavy consumption, and prices are steady, as last quoted:

Common Sheet, No. 16 to 28.....4½¢
Common Sheet, No. 22 to 25.....4¢
Common Sheet, No. 16 to 21.....3½¢
Best Refined 14¢ to 15¢ advance on the above.
Best Sheet, No. 22 to 25.....6½¢
Best Sheet, No. 22 to 25.....6½¢
Best Sheet, No. 16 to 21.....6½¢
Common Red Plates, 3-16 to 16.....3½¢
Blue Annealed, 3-16 to 16.....3½¢
Best Bloom Sheets, No. 22 to 25.....6½¢
Second quality, discount.....35¢

Wrought Iron Pipe.—The demand is unusually large, but prices are irregular and unsettled. Boiler Tubes are quoted at 45¢, and Gas and Steam Pipe, 65¢ discount from list price. Wholesale lots may be had on somewhat better terms.

Steel Rails.—There is a very active demand, and some heavy transactions have been closed during the week. One contract has been closed for nearly 20,000 tons at about \$60, delivered in Savannah. This sale will net about \$55 at mill in Eastern Pennsylvania, and as the deliveries will extend through the winter months, the sale is considered a very fair one. English Rails were offered at the same figure, and it was deemed advisable to meet their price and keep the order at home. Other lots for summer delivery have been sold at \$60, which is now considered an outside rate, extreme figures being from \$55 to \$60 at mill, according to delivery. English Rails have sold at about \$61.50 New Orleans, to \$63 Galveston. Total sales during the past six months of foreign Rails for these ports are estimated at fully 100,000 tons.

Steel Blooms.—Buyers are offering \$43 to \$44, duty paid, and although sellers are willing to sell in sterling at equal to \$44, we cannot learn that any business has been actually closed.

Iron Rails.—There is some inquiry, and sales to the extent of 5000 tons are reported. In this vicinity the mills are full up to about September, and it is difficult to place an order for delivery previous to that date. A sale of 3000 tons is reported at \$46, but as a rule \$47 is asked for summer, and \$46 to \$46.50 for the more deferred deliveries. A number of sales of small lots have been made at prices from \$47 to \$50, according to section. Some business has also been done in English Rails, but we have not been able to obtain particulars as to prices.

Railway Supplies.—Spikes are dearer, and for prompt delivery are firmly held at \$2.75. For fall and winter about 10¢ less is quoted. Fish Plates are steady at 2.3¢ to 2.5¢.

Old Rails.—Prices are a shade lower, but the market is steady, with some indications of a reaction. It is impossible to give exact quotations, as much depends upon convenience for deliveries and the urgency with which sales are pushed. In forced sales \$20 to \$25.50 is about all that can be obtained, while for shipments \$26 is offered without finding takers. The demand is certainly not very active, but within the past week prospects appear more favorable to holders, and it is likely that the course of the market will be more clearly defined in course of a week or two.

Crop Ends.—Latest sales \$27 ex ship. No lots offered this week.

Old Car Wheels.—Offered at \$30 on cars.

Scrap Iron.—Nominal at \$19 to \$20 for Cast, and \$27 to \$29 for Wrought.

PITTSBURGH.

(By Telegraph.)

Pittsburgh, Pa., June 15, 1881.

The Western Nail Manufacturers' Association held a meeting in this city to-day, which was largely attended. Reports indicate increased demand and large consumption, with firmer prices.

Office of The Iron Age, 77 Fourth Avenue, PHILADELPHIA, June 14, 1881.

Business in manufacturing circles continues unsatisfactory, the iron trade in particular being in a most unsatisfactory and unsettled condition; and while hopes of an early improvement are entertained, the prospect is not so encouraging as it was a month ago. The recent decline in Pig Iron is having a bad effect in all departments of the iron trade. It is well to mention that Pittsburgh is beginning to have a formidable competition in the West, where blast furnaces and rolling mills are being put up in all directions, and while they have to pay more for coal, they have the advantage of rail transportation.

Pig Iron.—The situation, as already intimated, is far from being satisfactory. The recent decline has had, as might be expected, a tendency to further curtail the demand, as consumers are apprehensive that prices may go still lower. It is asserted by well-informed operators that stocks in first hands, not only here, but throughout the West, are by no means large. Some of the furnaces are still sold from one to three months ahead, and furnacemen generally say that they will either bank up or blow out in preference to selling their product for less than cost. Unfortunately, there are some furnacemen who are so fixed financially that they are obliged to realize. However, the number of these is small, and it is thought that as soon as they are relieved, and the foreign iron being pressed on the market is disposed of, a better state of affairs, so far, at least, as the furnacemen are concerned, will prevail. The consumption is large, and is likely to continue so during the remainder of the year; and as quite a number of furnaces have blown out, thereby decreasing the production, furnacemen are hopeful that the cloud now hovering over this interest will soon be removed.

Good brands of Neutral Forge can be had at \$22 to \$22.50, 4 mos., and fair ditto at \$21 to \$21.50; Foundry grades, \$22.50 to \$23, 4 mos., for No. 2, and \$24 to \$24.50 and \$25 for No. 1—the latter an outside price. Nothing doing in all-ore or Bessemer Irons. Foreign Bessemer, it is said, can be delivered here from the seaboard at about \$25.50 to \$26, which is from \$1.50 to \$2 ½ ton less than furnaces in this section of the country can sell it for and make anything.

Manufactured Iron.—The demoralized condition of the raw article has not been without its effect on the market for the products. Buyers, in view of the decline in the former, will naturally be apprehensive of the latter sympathizing; but manufacturers, so far as we can learn, show no disposition to make concessions, and, notwithstanding the decline in the raw article, Finished Irons are higher than they were a month ago. We continue to quote Bars at 2.15¢ to 2.25¢ basis, 60 days, 2¢ off for cash; Sheet on a basis of 3.60¢ to 3.75¢ for No. 24; Tank, 2.65¢ to 2.75¢; Hoop, 2.80¢ to 2.90¢; standard brands Boiler Plate, 5½¢.

Nails.—The Nail trade continues quiet for the season, but manufacturers, notwithstanding they have been badly disappointed in the spring business, are hopeful of an increased summer and an active fall trade. The card remains unchanged at \$3.15, 60 days, 2¢ off for cash, but sales are being made at \$2.

WRENN, May 29, 1887.—*Iron*.—The situation in Austria seems to be on the road to a partial improvement, without, however, leading to expectations of a sanguine nature. The demand has of late been on the increase, and there are well-founded assurances that greater requirements are in immediate prospect. Of course, the main feature of greater activity has been the Steel Rail deliveries for the Servian railroads and the Pesth-min line, but these two cases are by no means

orders have dropped in for all sorts of iron goods on a smaller scale. For branch railroads in Bohemia, the firm of Musika & Schaebl just made a contract to deliver at once 8000 tons of steel rails. Of structural iron, Vienna, together with the provincial cities, just at present take decent amounts, and, besides, hardware for builders' use. But the prices obtained are still very moderate, and in a few cases sales have been made below cost. The Southern Railway of France, we are glad to say, has just ordered 20 Vienna locomotives, while the Pesh-Semlin line stands in need of 40 more. The consolidation of Alpine works proceeds but slowly. Iron has been weak at Vienna. We quote: Pig 44 @ 52 forins per ton at the works; Merchant Iron, 100 @ 115; Sheets, 145 @ 180; and Pillars, 115 @ 118. Metals have remained rather depressed. We quote: Copper, 70 @ 75; Tin, 112 @ 117; Lead, 20 @ 21; Spelter, 25, and Sheet Zinc, No. 9 to 25, 25 forins the 100 kilos.

EAST INDIES.

(Gillilan, Wood & Co.)

SINGAPORE, April 30, 1881.—TIN.—Sales during the fortnight aggregate 170 tons at \$27 @ \$27.25 per picul, and at the close \$27.25 per picul has been offered and refused. Supplies continue on a moderate scale here and in Penang. Freight.—Several vessels "to arrive" have been fixed to load homeward. Shippers are becoming impatient, as vessels chartered weeks ago still keep out, although considerably overdue. Berth rates have advanced to 50 for dead weight to London and Liverpool. For New York the Glance and Charity have arrived and are now loading. The Louis Sheller, shortly due, has engaged some cargo. For Boston nothing has been done; the S. D. Carleton still keeps out. Exchange advanced to 3/10 1/2 for 6 months' sight private bills, but less favorable news of the progress of the conference having been received, the rate has declined to 3/10.

SCIENTIFIC AND TECHNICAL.

The Engineer contains the following description of

A NEW HIGH-SPEED MOTOR,

invented by the Hon. R. C. Parsons, and manufactured by Messrs. Kitson & Co., of Leeds, England. Externally it consists of a closed cylindrical vessel, from one side of which the end of the crank shaft protrudes. The interior of the closed cylindrical vessel contains a steam engine, having four single-acting cylinders arranged radially round the crank-shaft, the center line of which is normal to the plane in which they lie. Mr. Parsons contents himself with a moderate speed for the reciprocating parts, viz., pistons and connecting rods. He does not allow for them a greater number of reciprocations than corresponds with, say, 450 revolutions per minute, and therefore keeps down the tendency to rattle, hammer, and disintegrate to a minimum. But he doubles the number of revolutions for the crank shaft by the simple expedient of causing the casting forming the united four cylinders also to rotate in the same direction as the shaft. Of course the casting referred to must be carefully balanced, but the radial arrangement makes this quite easy. And thus the high speed of 900 revolutions per minute is, it is claimed, attainable, and steadily maintainable, without noise, shake, undue wear and tear, or any known disadvantage beyond such as any other similar engine would be liable to when running at 450 revolutions. The object of the closed cylinder casing is obviously to collect the exhaust steam which clears itself away from the cylinders in succession the instant release takes place. It further serves the purpose of maintaining the temperature of the cylinders at at least 212 degrees, and of enabling the exhaust steam, and any intermixed lubricants to get at all inclosed moving parts. It also acts as a dust excluder and safety guard. There is yet another new feature included in Mr. Parsons' engine. We have for some time become familiarized with the use of small pumps, attached to certain machines, for pumping oil or a soap and water solution upon or under the cutting edge of a tool. The oil or solution afterward flows away into a collecting reservoir, and is again utilized and reutilized indefinitely. Mr. Parsons adopts this principle for lubricating the rapidly-revolving parts of his engine. He then makes use of a continuous flow of oil at a sufficient pressure to keep apart the wearing surfaces, which ought, therefore, to remain cool and uninjured for any length of time, provided the small pump is kept in operation. "The possible disadvantages," says the Engineer, "which may attach to the new motor seem to be threefold, viz: 1. It may prove to be heavy and expensive as to first cost, in proportion to power developed. There is obviously the cost of the cylindrical inclosing vessel, of the extra mechanism for rotating the cylinders, and of the oil-circulating machinery to provide. On the other hand, double the power is gained by double the speed, and this will 'cover a multitude of sins.' To credit, there is also the bed-plate and supports of some kind, which, but for the casing, would be necessary. 2. Like all single-acting engines, the pistons are working during half only of each revolution. This means extra weight and original cost foot-pound of power developed, as compared with double-acting cylinders. 3. It cannot be an economical engine if the pistons be made to act inward, because that would manifestly involve the usual long steam passages to convey the steam for the central distributing valve to the outer ends of the cylinders. The large obnoxious spaces thereby formed prevent all chance of economy. It is, however, not clear whether the steam may not now or might not possibly be made to act outward in connection with the large surrounding exhaust chamber, and whether in such case large obnoxious spaces may not be used. It is understood that Messrs. Kitson & Co. are manufacturing this motor for Mr. Parsons, and that modifications have already been designed for other purposes as well as for driving dynamo-electric machines."

At a recent meeting of the Society of Arts, Mr. Alexander Siemens and Dr. C. W. Siemens gave some very interesting facts in regard to

THE BERLIN ELECTRIC RAILWAY, which is now in operation between Lichterfelde and the Military Academy. It is a single line with 3.3-foot gauge, and is a little over 1 1/2 English miles long. The permanent way has been constructed in exactly the same way as that of railways; wooden sleepers and steel rails are employed, the rails being connected, in addition to the usual fish plates, by short straps of iron, bent in the shape of a bridge, so as to admit the adjustment of the rails to different tempera-

tures, and to reduce at the same time the electrical resistance. As the currents are low tension currents, it was not necessary to provide further insulation, and no difficulty is experienced in using one rail as the positive and the other as the negative conductor. About a third of a mile from the Lichterfelde station the primary machine, with its steam engine, is erected in the engine house of the water works, and the current is conveyed from there to the rails by underground cables. The car is exactly similar to an ordinary tram car, and is constructed to hold 20 persons besides the guard. It is symmetrical, and can move backward and forward, each end being provided with a starting lever for the guard, a brake handle and a signal bell. The dynamo machine is placed underneath the car, and transmits its movement to the wheels by means of spiral steel springs. The tires of the wheels are insulated from their axles, and are in electrical connection with brass rings, fastened on the axles, but insulated from them. Contact brushes press against these brass rings, and from them the current is conducted to the dynamo machine, and sets it in motion. One of the remarkable features connected with the electric transmissions of power is that as the resistance to be overcome in the railway carriage increased, so did the force increase to overcome the resistance. Thus, in going on a level, the power used to propel the train might be 10 horse-power; but when the train ascends a gradient of 1 in 80, which is the steepest on the line, then the power necessary to drive the dynamo machine at the station increases, and the power transmitted to the carriages increases in a still greater ratio. The speed of the Berlin railway is greater now than in the beginning, and the carriages have gone to the distant station and back in 7 1/2 minutes, which meant an average speed of about 25 miles an hour. A difficulty has arisen, as happened with most new inventions, and this difficulty is of a most peculiar kind. In the Berlin railway one rail conducts the current toward the carriages and the other takes it back to the station. Now, if a man passes over the line at a level crossing, no harm is done, because he puts his foot on only one rail at a time; but a horse, being endowed with four feet, sometimes puts one foot on one rail and another on the other, and thus experiences a most inconvenient shock, so much so that horses decidedly object to these level crossings, and it has become necessary to make some special arrangements to avoid this inconvenience. It suffices to put one rail at the crossings out of circuit, and to connect the backward and forward rail electrically. This experiment shows the practicability of the system, but it is not by any means to be supposed that the electric railway will banish locomotive engines from our great thoroughfares. The electric transmission of power would be efficacious, no doubt, for local traffic, such as tramways, and also for lines conveying minerals from the interior of a mine to the bank, and, in exceptional cases, for the transmission of heavy trains along rails. One of these cases was presented by the St. Gothard Tunnel. The company to which that belonged were fully alive to all modern improvements, and had requested them to work out a plan for utilizing the hydraulic power, which could be had in great abundance near the mouth of the tunnel, for the passage of the train through the tunnel. In this country the elevated railroads are giving much consideration to the subject of using the electric current in this manner.

STORING UP ELECTRICITY,

and many erroneous and extravagant ideas prevail as to the practical value of the Faure secondary battery, to which the attention of the scientific world has been called by a paper read by M. Roynier before the Société d'Encouragement. The invention is really a new secondary battery, or rather an improvement on the well-known secondary battery of M. Planté. A secondary battery, it is hardly needful to say, is one which is charged by the action of a battery or machine, and then gives out this charge as required. In the Planté battery the electrodes are of lead, and they are immersed in acidulated water. In M. Faure's battery the two lead plates of the couple are each covered with minium (red lead) or another insoluble oxide of lead, then inclosed in felt and kept in place by lead rivets. These two electrodes are then put side by side in a vessel of acidulated water. If they are very long, they are rolled up like those of M. Planté. Thus constructed, the couple is charged by causing an electric current to traverse it, when the red lead is reduced to the state of peroxide on the positive electrode and lead upon the negative electrode. When the whole mass has been thus electrolyzed the couple is ready for discharging. On being discharged again, the reduced lead is oxidized, and the peroxide is reduced until the couple becomes inert. It is then ready for a new charge of electricity. It is stated that a quantity of energy can be stored capable of performing a horse-power of external work during an hour in a Faure battery of 75 kilograms in weight. Mr. W. H. Preece, the famous English electrician, during a recent discussion at the Society of Arts, speaks as follows on the Faure battery: "It has a pretty high amount of force, being equal to about 2 1/2 Daniell's cells, but it is a battery of very low internal resistance, and therefore able to give a considerable current. In all questions of this kind where electricity is applied, a very important element is introduced, viz., the element of time. It is perfectly feasible and practical to produce a powerful current of electricity that will last a minute, or even three minutes, but for lighting and tramway purposes, or the ordinary power purposes in arts and manufactures, something that would last a very much longer time is wanted. This particular battery that is supposed to store electricity lasts but a short time; it gives a powerful current, it is a pretty thing, but it is not at present practical."

In the course of 1880, there passed through the Suez canal 217 ships, with a tonnage, according to official reckoning, of 2,860,448,

but really amounting to 4,378,064. The number of hands employed in the navigation was 128,453; the number of passengers, 53,517. Of the 2,860,448 tons official reckoning, 2,247,306 were British, 177,771 French, 75,829 Austrian, 124,088 Dutch, 71,039 Italian, 56,245 Spanish, 33,162 German, 29,607 Russian, 7203 Turkish, and 8032 Egyptian, while 25,187 tons belonged to other States.

The new Brooklyn Bridge trustees are: John T. Agnew, John G. Davis, Robert B. Roosevelt, Erasmus W. Smith, J. Adriance Bush, Henry Clausen, Thomas C. Clark and Charles McDonald. All are reappointed with the exception of Messrs. Clark and McDonald, who are civil engineers. The first was appointed in the place of Imac Newton, who resigned to take the position of Chief Engineer of the Croton Aqueduct, and the last in place of John H. Mooney. Mr. Clark is president of the Phoenix Bridge Company, of Phoenixville, Pa., and Mr. McDonald is president of the Delaware Bridge Company.

Mr. John R. Cammisa, president of the Beach Pneumatic or Broadway Underground Railway, and other gentlemen who succeed to the rights of the old corporation, claim that under the recent change of name by the Legislature and other acts recognizing their legal existence, the road has a prior and unquestioned right to Broadway, and that money for building is pledged whenever all legal matters are arranged. Judging from the present disposition of those concerned in the proposed consolidation of the Central Underground and Broadway Connecting Railway, the time spoken of may be some distance in the future.

Mr. F. E. Bachman, A. C., chemist of the Carbon Iron and Pipe Co., Limited, of Parryville, Pa., calls our attention to an omission in our report of Mr. Kent's paper on "Manganese Determinations in Steel," in which chemist G is made to say: "Unite the filtrates and precipitate in hydrochloric acid, weigh as pyrophosphate." It ought to read: "Unite the filtrates, precipitate with bromine and dissolve in hydrochloric acid, weigh as pyrophosphate," &c.

The strike at Oxford, N. J., still continues.



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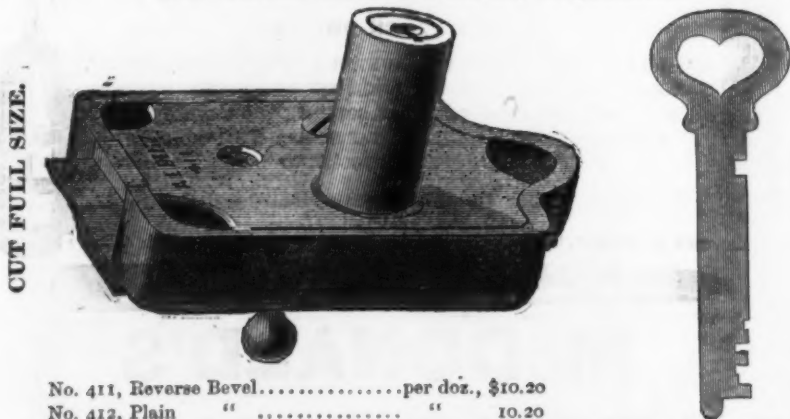
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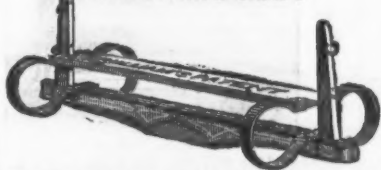
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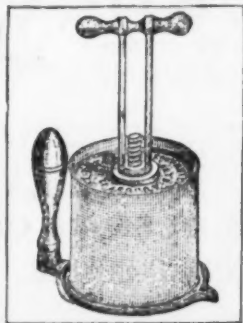
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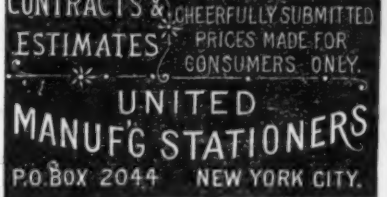
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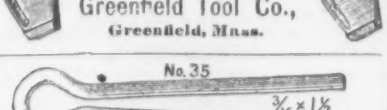
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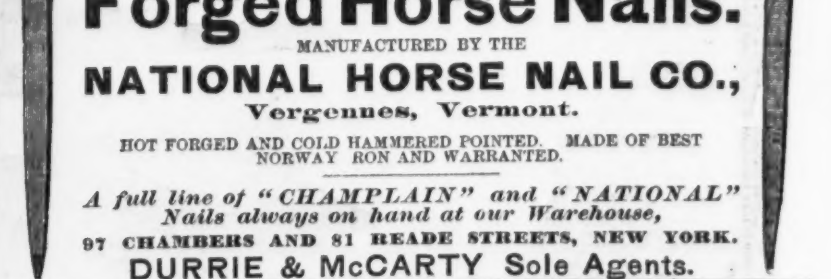
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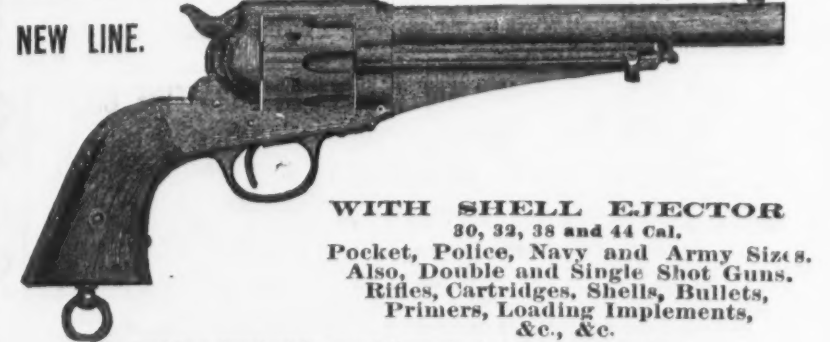
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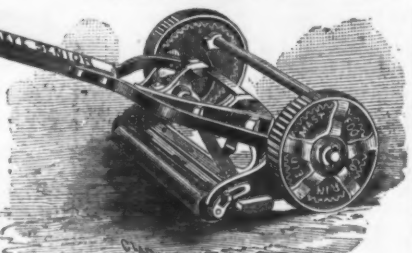
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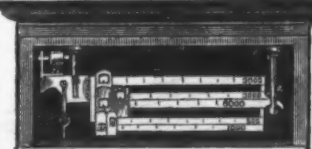
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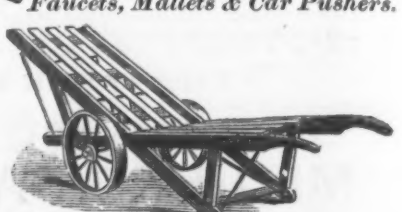
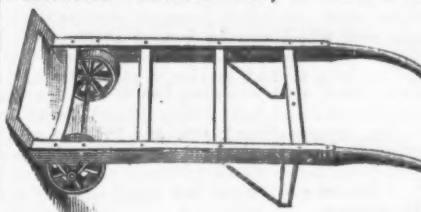
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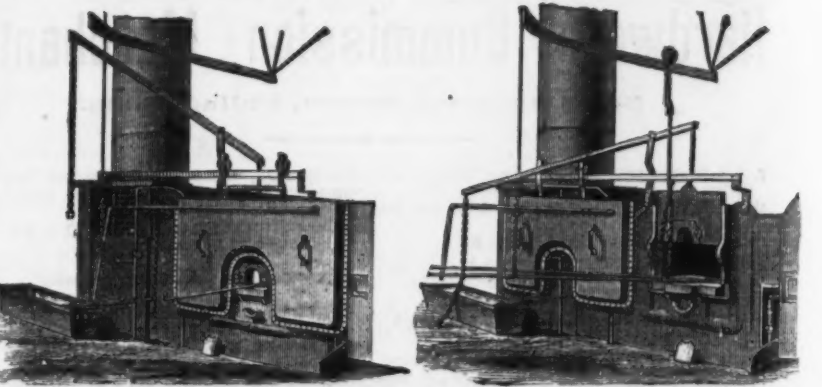
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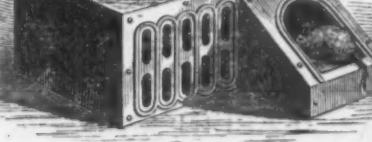
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Stephens Patent Vise Co., 41 Dey, N. Y.
Vises, Pipe Fitters.
Falconet & Maule, Phila., Pa.
Wheels, Railroad.
Bowler & Co., Cleveland, O.
Lewis John T. & Bros., 213 1/2 Front Phila., Pa.
Whetstones.
Pike A. F., Pike Station, N. H.
Window Blinds.
Brooklyn White Lead Co., 183 Front, N. Y.
Jewett John & Sons, 183 Front, N. Y.
Lewis John T. & Bros., 213 1/2 Front Phila., Pa.
Window Springs, Makers of.
Huginn R. B., Hartford, Ct.
Wire, Manufacturers of.
Cary & Moon, 234 W. 25th, N. Y.
Cleveland Rolling Mill Co., Cleveland, Ohio.
Gantler Steel Co., 14 Broadway, N. Y.
Gilbert & Bennett Mfg. Co., 273 Pearl, N. Y.
Harrison Wire Co., St. Louis, Mo.
Hornhelm L., 105 John, N. Y.
Hovars Bros., 15 Front, N. Y.
Perkins Geo. W. & Co., Holyoke, Mass.
Perkins & Choate, 23 Nassau, N. Y.
Washburn & Moen Mfg. Co., Worcester, Mass.
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E. Barum's Wire Works, Detroit, Mich.
Gilbert & Bennett Mfg. Co., 273 Pearl, N. Y.
Wire Nails.
Duerst & Whidden, 93 Warren, N. Y.
Field A. & Sons, Taunton, Mass.
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IRON—AMERICAN.

Foundry No. 1.	100 #	\$24.00
Gray Forge.	100 #	\$20.00
Exelton.	100 #	\$21.00
Carbide.	100 #	\$22.00
Coltess.	100 #	\$23.00
Giesmarck.	100 #	\$23.00
Gertshorn.	100 #	\$23.00
Iron.	100 #	\$23.00
Steel (at mill).	100 #	\$23.00
Old Rail.	100 #	\$23.00

STEEL.—Duty Bars, Ingots, Sheets and Coils valued at 7 cents #, or under, 24 cents; over, 7 cents, and not above 11 cents #; over 11, 15 cents #, and to 5 ad val. Railway Bars, 14 cents #. Provided, that Metal cement, cast or made from iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.

Best Cast.	100 #	\$15.00
Extra Cast.	100 #	\$16.00
Round Machinery, Cast.	100 #	\$16.00
Swaged Cast.	100 #	\$16.00
Best Double Shear.	100 #	\$16.00
German Steel, Best.	100 #	\$16.00
Sheet Cast Steel, 1st quality.	100 #	\$16.00
Sheet Cast Steel, 2nd quality.	100 #	\$16.00
Sheet Cast Steel, 3rd quality.	100 #	\$16.00

ANTHONY.—See Trade Report.

IRON—DUTY.—Pig, 7 #; Sheet, 3 #; Wrought Sheet, 3 #; Wrought Scrap, 2 #; Cast Scrap, 60 per ton. Railroad Rod, 100 #; Boiler and Plate, 140 #.

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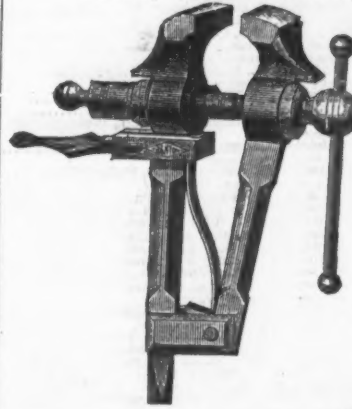
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10 x 34 to 10 x 44.	8.75	10.00	10.75	11.50
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10 x 64 to 10 x 74.	11.00	12.25	13.00	13.75
10 x 74 to 10 x 84.	11.75	13.00	13.75	14.50
10 x 84 to 10 x 94.	12.50	13.75	14.50	15.25
10 x 94 to 10 x 104.	13.25	14.50	15.25	16.00
10 x 104 to 10 x 114.	14.00	15.25	16.00	16.75
10 x 114 to 10 x 124.	14.75	16.00	16.75	17.50
10 x 124 to 10 x 134.	15.50	16.75	17.50	18.25
10 x 134 to 10 x 144.	16.25	17.50	18.25	19.00
10 x 144 to 10 x 154.	17.00	18.25	19.00	19.75
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10 x 174 to 10 x 184.	19.25	20.50	21.25	22.00
10 x 184 to 10 x 194.	20.00	21.25	22.00	22.75
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6 x 8 to 10 x 14.	\$6.50	\$7.75	\$8.50
10 x 14 to 10 x 24.	7.25	8.50	9.25
10 x 24 to 10 x 34.	8.00	9.25	10.00
10 x 34 to 10 x 44.	8.75	10.00	10.75
10 x 44 to 10 x 54.	9.50	10.75	11.50
10 x 54 to 10 x 64.	10.25	11.50	12.25
10 x 64 to 10 x 74.	11.00	12.25	13.00
10 x 74 to 10 x 84.	11.75	13.00	13.75
10 x 84 to 10 x 94.	12.50	13.75	14.50
10 x 94 to 10 x 104.	13.25	14.50	15.25
10 x 104 to 10 x 114.	14.00	15.25	16.00
10 x 114 to 10 x 124.	14.75	16.00	16.75
10 x 124 to 10 x 134.	15.50	16.75	17.50
10 x 134 to 10 x 144.	16.25	17.50	18.25
10 x 144 to 10 x 154.	17.00	18.25	19.00
10 x 154 to 10 x 164.	17.75	19.00	19.75
10 x 164 to 10 x 174.	18.50	19.75	20.50
10 x 174 to 10 x 184.	19.25	20.50	21.25
10 x 184 to 10 x 194.	20.00	21.25	22.00
10 x 194 to 10 x 204.	20.75	22.00	22.75

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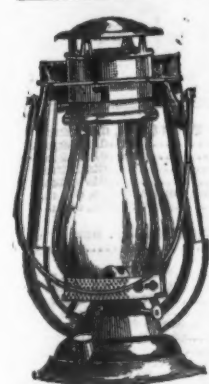
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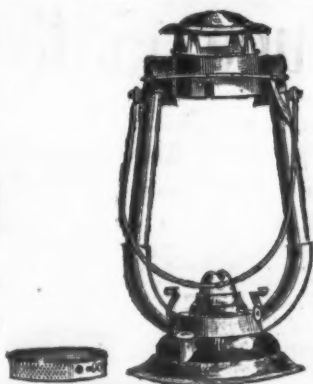
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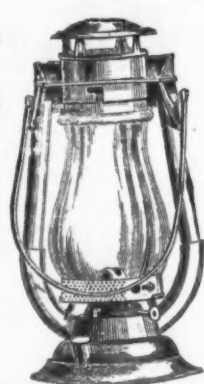
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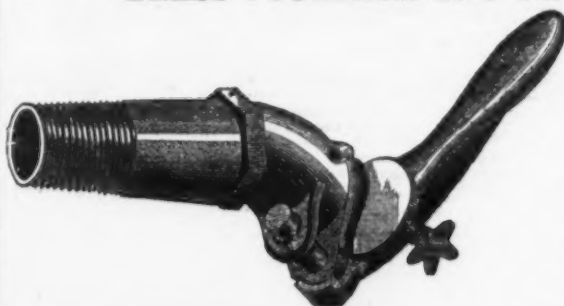
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Albany, N. Y., Dec. 8, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit, &c., on Wednesday, the 8th day of December, 1880.

Present, Hon. H. B. Brown, District Judge.

NELSON LYON

against

GUYON T. FISHER, et al.

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jeremiah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 3, 1873, and numbered 128,843, granted and issued to Joseph Baraloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That the said Joseph Baraloux was the original and first inventor of the improvements in metallic heel stiffeners for boots and shoes (reels mentioned) and described in said letters patent.

That the Reissued Letters Patent No. 918, dated May 11, 1880, granted to said Nelson Lyon for an improvement in metallic heel stiffeners for boots and shoes, originally patented as aforesaid, is a good and valid patent; that said Lyon is exclusively possessed of said Letters Patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, WILLIAM H. KING, in my care at the above address.

NELSON LYON.



Wilson Bohannon,

Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

127 Catalogues and samples sent upon application.



BROOKLYN, N. Y.

[illegible]

CHAMPION TOBACCO CUTTERS,
PATENT MEASURING FAUCETS,
SELF-WEIGHING CHEESE KNIVES,
&c., &c.

Steel.

WOLFF, KAHN & CO.,

MANUFACTURERS OF

Steel Wire

For All Purposes.

Special Finest CAST STEEL WIRE,

MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET, LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

IRON, STEEL, & RAILS
OF EVERY DESCRIPTION.WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,
GUN BARRELS, MOULDS, AND ORDNANCE.

Shipments in bond from American Ports and direct from Europe to all parts of the World.

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Direct all communications to be

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Manufacturers of**CRESCENT STEEL,**

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in quality, finish and accuracy.

Also Common Grades.

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For Drills, Cold Chisels, Tools, Taps, Dies, &c.

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Manufacturers of

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Iron Rail and Fastenings,**SPRING STEEL**

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WIRE OF ALL KINDS,Tire, Axles and other Forgings,
Roller Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and
Siding of Siemens-Martin, Bessemer Steel and Iron.

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Extra Mild Center Steel, special for Taps,

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STEEL Gautier Steel.
See Page 3.

Steel.

NEWARK STEEL WORKS.**BENJAMIN ATHA & CO.,**

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BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

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Water St.; at Chicago by S. D. KIMBARK, 80 to 82 Michigan Ave.**ALBANY & RENSSELAER IRON & STEEL CO.,****Troy, N. Y.,**

Office in New York City, 56 Broadway,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

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Sole Manufact'rs of **"CHOICE" Extra Cast Steel.**

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

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(SIEMENS' PROCESS.)

MANUFACTURERS OF

Steel Rails,

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Steel Forgings,

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Resident Agents for the United States,

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Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
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A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either
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Combination Chrome Steel and Iron for
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Price List.

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JOLIET STEEL COMPANY,

MANUFACTURERS OF

Steel Rails,

ALL WEIGHTS.

The Company warrant its Rails equal in quality to any manufactured in the
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C. E. SARGENT, Secretary.**CHICAGO.**

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H. S. SMITH, General Sup't.

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Works, Joliet, Ill.

Steel.

R. MUSHET'S**Special Steel**

FOR

LATHES, PLANERS, &c.Turns out at least double work by increased speed
and less, and cuts harder metals than any other
Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

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For Boilers, Fire-boxes, &c.

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For Railroad purposes, &c.

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Tin and Terno Plates and Metals.

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Cannon Street, London, E. C.

Iron and Steel Merchants,Exporters of Iron and Steel Rails, Blooms, Spie-
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Iron Ores, &c. Sole agents for the sale of the Vena
Dulce (Somorostro) Iron Ore from the Magdalena
Mine. Shipping Port: Bilbao.

Analysis of "Magdalena" Ore.

Silica.....	4.05
Peroxide of Iron.....	54.60
Oxide of Manganese.....	1.65
Alumina.....	1.54
Lime.....	0.33
Magnesia.....	traces
Phosphoric Acid.....	0.04
Sulphuric Acid.....	0.42
Combined Water.....	5.97
Moisture.....	2.43
	100.43

Metallic Iron..... 59.72

The Sulphuric Acid exists as Sulphate of Lime
and is, in my opinion, not detrimental.

Signed, E. D. RILEY, F. C. S.

Cable address:

HENRY CARTER, London.**JAMES COMLY,**

4739 Paul St., Frankfort, Philadelphia, Pa.,

Manufacturer of



Hardware Novelties, Glass Cutters, &c.

Metal Workers' Crayons.More convenient and cheaper than either com-
mon or French chalk. For manufacturers of all
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Sole Manufacturer,

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Gunpowder.**GUNPOWDER.****DUPONT'S****Rifle, Sporting and Blasting Powder**

The most popular Powder in use.

Dupont's Gunpowder Mills, established
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reputation for 78 years. Manufacture the follow-
ing celebrated brands of Powder:**DUPONT'S DIAMOND GRAIN.**
Nos. 1 (coarse) to 4 (fine), unequalled in strength, quick-
ness and cleanliness; adapted for Glass Ball and
Pigeon Shooting.**DUPONT'S EAGLE DUCKING.**
Nos. 1 (coarse) to 3 (fine), burning slowly, strong and
clean; great penetration; adapted for Glass Ball
Fishing, Duck and other shooting.**DUPONT'S EAGLE RIFLE.**
A quick, strong, clean Powder of very fine grain for
Rifle and Rifle shooting.**DUPONT'S RIFLE, Fg. "Sea Shooting."**
FFg and FFFg. The Fg for long range rifle shoot-
ing, the FFg and FFFg for general use, burning
strong and moist.Also all kinds of Sporting, Mining, Shipping and
Blasting Powders of all sizes and descriptions. Special
grades for export. Also, Musket, Cannon, Mortar
and Mammoth Powder, U. S. Government standard.
Powder manufactured to order of any required grain
or proof. Agencies in all cities and principal towns
throughout the U. S. Represented by**F. L. KNEELAND, 87 Beaver St., N. Y.**N. B.—Use none but Dupont's Fg or FFg Powder
for long-range Rifle shooting.**GUN POWDER.****Laflin & Rand Powder Co.**

No. 29 Murray Street, New York.

Manufacture and sell the following celebrated brands
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more popular than any Powder now in use.

Blasting Powder and Electrical Blasting**Apparatus.**

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM**FUSES.**

Pamphlets showing sizes of grain sent free.

We invite
Bolts, Un-
manufac-
quality. Ou-
ness; all our

ELBA

Steel.

NORTH CHICAGO ROLLING MILL CO.

ESTABLISHED 1867. CAPITAL, \$3,000,000. INCORPORATED 1869.
Works at Chicago, Ill., and Milwaukee, Wis.MANUFACTURERS OF
MERCHANT BAR, FISH PLATES, PIG METAL,
IRON RAILS & BESSEMER STEEL RAILS.

Fish Plates.....	13,000 tons
Merchant Bar.....	40,000 "
Pig Metal.....	100,000 "
Iron Rails.....	110,000 "
Steel Rails.....	100,000 "
Total Capacity per year.....	463,000 "

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37 Mitchell Block, Milwaukee, Wis.

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N. THAYER, Jr., Vice-President, Boston.
S. CLEMENT, Treasurer, MILWAUKEE.
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THE SIEMENS-ANDERSON STEEL CO.,

Successors to ANDERSON & CO.,
Manufacturers ofCrucible Tool, Cast Spring, Cast Plow, Iron Centre,
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Ladies.

All the regular sizes in stock, with nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.

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MOORHEAD & CO.,

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GALVANIZED SHEET IRON,

Juniata, Charcoal and Common.

Sheet & Plate Iron,

And Special Sizes for Sap Pans.

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FIRST QUALITY. SECOND QUALITY

NOTICE.

Hereafter our GALVANIZED SHEET IRON will be branded as per cuts in margin. We have adopted these

TRADE MARKS

to protect ourselves and the trade against imitations of our iron, as was the case under our old brands.

THIRD QUALITY

as heretofore

REFINED.

January 1, 1881.

BELLAIRE NAIL WORKS,

PIC IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS,

Office and Works, Bellaire, Ohio.

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

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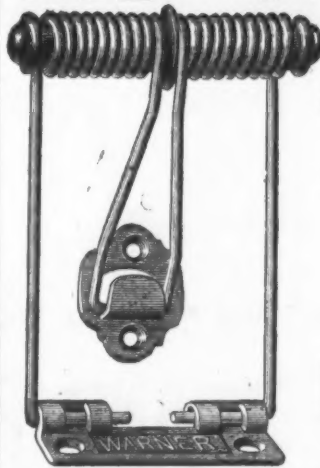
Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge, and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

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THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door tight when closed, and allowing it to open without increasing the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

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They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

FREDERIC BARTLETT,
FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

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OFFICE: 44a CANNON STREET, LONDON, E. C.

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The Weekly, Legal Notes, Trade Notes, Bankruptcies, Foreign Notes, Colonial Jottings, Merchants' Circulars, &c., are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

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to the Ironmonger and Metal Trades' Advertiser, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful Ironmongers' Diary and Text Book, a work sold to non-subscribers at 75 cents.

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This is an annual presented free to every subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication for the next twelve months will be as follows:

JUNE 25, JULY 23, AUGUST 20, SEPTEMBER 17, OCTOBER 8, NOVEMBER 6, DECEMBER 3 and 31, JANUARY 28, FEBRUARY 25, MARCH 25, APRIL 23, and MAY 20, 1882.

This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach out in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the Ironmonger and Foreign Supplement is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

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Established 1845.
Office, foot of Houston Street, East River,
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NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
PHILADELPHIA.
Above Race,
Twenty years' practical Experience.

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Clay Retort and Fire Brick Works,
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Manufacturers of Clay Retorts, Fire Brick,
Gas House and other Tile.

VAN DYKE, ELIZABETH, RICHARDS & PARTITION STS.
Office, 88 Van Dyke St., Brooklyn, N. Y.

WATSON FIRE BRICK CO.,

ESTABLISHED 1856.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey.

FIRE BRICK,

OR ROLLING MILLS, BLAST FURNACES, FOUN-
DRIES GAS WORKS, LIME KILNS, TANNERIES,
BOILER and GRATE SETTING, GLASS WORKS, &c.
Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

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Retort Works.

Manufacturer of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.
Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1848.

Manufacturers of

FIRE BRICK,

Furnaces, Tiles, Blast Furnace Blocks, &c. Miners and
Foundrymen's Woodbridge Fire Clay and Sand, and Staten
Island Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,
TILE & FURNACE BLOCKS,
OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and
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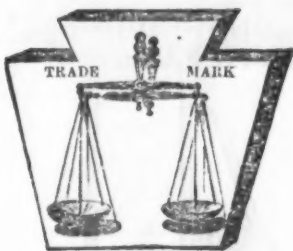
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WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

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No cleaning out of fires during the day. Parts
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The Purity and Strength of this Coal especially adapt it for the working
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MANUFACTURERS OF

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Manufacturers of the well-known brand of
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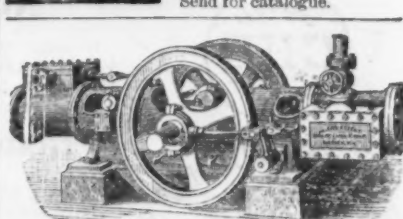
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CIRCULAR SAWS.

I use none but best refined
cast steel, selected. All saws
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A trial of our goods will sat-
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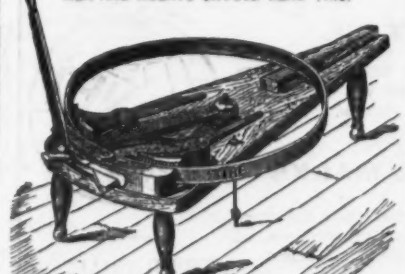
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This machine is strong, durable and cheap, and it
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wagon tires, and bars of iron without cutting them.
I will upset tires one inch at a heat, and is adapted
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Price only \$12.00. Send for circular.

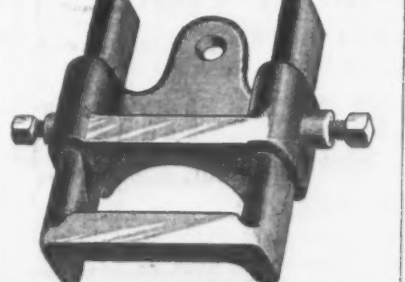
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Will hold all sizes of bolts up to 2½ inches; is
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Cook's Augers.	dis 40 c
Watrous' Ship Augers.	dis 40 c
Benjamin Pierce Auger Bits.	dis 40 c
Gravold Auger Bits.	dis 40 c
Cook's Augers.	dis 40 c
Jennings' Augers.	dis 10 c
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Stearns' Pat. Hot Augers, list \$1.50.	dis 20 c
Balances.	
Light and Common.	dis 10 c
Bells.	
Bell Bros. Mfg. Co. Light Hand Bells.	dis 60 c
Swiss Pattern Hand Bells.	dis 60 c
Connell's Door Bells.	dis 60 c
St. Western & Knickerbocker, new list.	dis 50 c
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Chambers' No. 1, for 1/2 bolt.	each \$7.50
No. 2.	9.00
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Upright, without Augers.	dis 40 c
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Philadelphia, Eastern Carriage Bolts.	dis 80 c
Stanley, Wrought Shutter.	dis 40 c
Breasts.	
Backus.	dis 60 c
Spofford.	dis 60 c
American Ball.	dis 60 c
Butts.	
Cast Fast Joint, Narrow.	dis 40 c
Broad.	dis 40 c
Cast Loose Joint, Narrow.	dis 40 c
Broad.	dis 40 c
Acorn Loose Pin.	dis 40 c
Jap'd.	dis 40 c
Mayer's Loose Joint.	dis 40 c
Wrought Loose Pin.	dis 40 c
Table Hinges and Back Flaps.	dis 40 c
Narrow, Fast.	dis 40 c
Loose Joint.	dis 40 c
Blind Huts.	
Parker.	dis 75 c
Clark.	dis 75 c
Shepard.	dis 75 c
Lail & Porter.	dis 75 c
Huffer.	dis 75 c
Chains.	
German Flatter and Coll. new list Oct. 22.	dis 60 c
Galvanized Chain.	dis 60 c
Best Proof Coil Chain-English.	dis 60 c
Chisels.	
Socket Framing.	dis 60 c
Rocket Firmer.	dis 60 c
Butcher's.	dis 60 c
Casters.	
Bed (new list July 1, 1880).	dis 50 c
Plate.	dis 50 c
Coffee Mills.	
Box and Side, new list Jan. 1.	dis 45 c
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Cutlery.	
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Hart Mfg. Co.	dis 50 c
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Timed.	dis 45 c
No. 0 1 2 3 4 5 6 7 8 9 10	dis 45 c
Burnished.	dis 60 c
No. 0 1 2 3 4 5 6 7 8 9 10	dis 60 c
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Nicholson.	dis 60 c
Diston.	dis 60 c
Batchelor.	dis 60 c
Spencer.	dis 60 c
E. M. Boynton, new list.	dis 60 c
Fluting Machines.	
Eagle.	dis 20 c
Crown.	dis 20 c
Geneva Fluter.	dis 20 c
Favorite Com. Fluter & Sad Iron.	dis 20 c
Hammers.	
Yorkes & Plumb's, new list.	dis 30 c
Handles.	
Yorkes & Plumb, new list.	dis 30 c
Hatchets.	
Yorkes & Plumb, new list.	dis 30 c
Hinges.	
Trap and T.	dis 40 c
Hoops.	
Hoops.	dis 40 c
Locks and Keys.	
Locks.	dis 40 c
Keys.	dis 40 c
Lanterns.	
Square Candle and Oil.	dis 40 c
Tubular.	dis 40 c
Globe, 25 cents extra per doz.	
Lawn Mowers.	
Pennsylvania.	dis 40 c
Laws and Garden Pumps.	
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Long and Short Cutters.	dis 40 c
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Mellasses Gates.	
Entertainer Mfg. Co's Measuring Faucets.	dis 20 c
Stebbins' Gates.	dis 20 c
Lincoln's.	dis 20 c
Landers, Fray & Clark's Petroleum.	dis 20 c
Scandinavian Padlocks.	dis 20 c
No. 0 1 2 3 4 5 6 7 8 9 10	dis 20 c
No. 11 12 13 14 15 16 17 18 19 20	dis 20 c
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Mower and Reel.	
Woodruff.	dis 30 c
Stowe.	dis 30 c
Hale's.	dis 30 c
American.	dis 30 c
Stuffer.	dis 30 c
Entertainer Stuffer.	dis 30 c
Pliers.	
Ohio Tool Co.	dis 25 c
Salt-ro.	dis 25 c
Auburn.	dis 25 c
New York Tool Co.	dis 25 c
Plane Irons.	
Butcher's.	dis 40 c
Plumb's.	dis 40 c
Stanley's Adjustable.	dis 40 c
Non-Adjustable.	dis 40 c
Picks.	dis 35 c
Pump.	dis 35 c
Hills.	dis 35 c
Stanley Ivory.	dis 35 c
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2 lb.	35.50
3 lb.	53.25
4 lb.	71.00
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8 lb.	142.00
9 lb.	159.75
10 lb.	177.50
11 lb.	195.25
12 lb.	213.00
13 lb.	230.75
14 lb.	248.50
15 lb.	266.25
16 lb.	284.00
17 lb.	301.75
18 lb.	319.50
19 lb.	337.25
20 lb.	355.00
21 lb.	372.75
22 lb.	390.50
23 lb.	408.25
24 lb.	426.00
25 lb.	443.75
26 lb.	461.50
27 lb.	479.25
28 lb.	497.00
29 lb.	514.75
30 lb.	532.50
31 lb.	550.25
32 lb.	568.00
33 lb.	585.75
34 lb.	603.50
35 lb.	621.25
36 lb.	639.00
37 lb.	656.75
38 lb.	674.50
39 lb.	692.25
40 lb.	710.00
41 lb.	727.75
42 lb.	745.50
43 lb.	763.25
44 lb.	781.00
45 lb.	798.75
46 lb.	816.50
47 lb.	834.25
48 lb.	852.00
49 lb.	869.75
50 lb.	887.50
51 lb.	905.25
52 lb.	923.00
53 lb.	940.75
54 lb.	958.50
55 lb.	976.25
56 lb.	994.00
57 lb.	1011.75
58 lb.	1029.50
59 lb.	1047.25
60 lb.	1065.00
61 lb.	1082.75
62 lb.	1100.50
63 lb.	1118.25
64 lb.	1136.00
65 lb.	1153.75
66 lb.	1171.50
67 lb.	1189.25
68 lb.	1207.00
69 lb.	1224.75
70 lb.	1242.50
71 lb.	1260.25
72 lb.	1278.00
73 lb.	1295.75
74 lb.	1313.50
75 lb.	1331.25
76 lb.	1349.00
77 lb.	1366.75
78 lb.	1384.50
79 lb.	1402.25
80 lb.	1420.00
81 lb.	1437.75
82 lb.	1455.50
83 lb.	1473.25
84 lb.	1491.00
85 lb.	1508.75
86 lb.	1526.50
87 lb.	1544.25
88 lb.	1562.00
89 lb.	1579.75
90 lb.	1597.50
91 lb.	1615.25
92 lb.	1633.00
93 lb.	1650.75
94 lb.	1668.50
95 lb.	1686.25
96 lb.	1704.00
97 lb.	1721.75
98 lb.	1739.50
99 lb.	1757.25
100 lb.	1775.00
101 lb.	1792.75
102 lb.	1810.50
103 lb.	1828.25
104 lb.	1846.00
105 lb.	1863.75
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110 lb.	1952.50
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112 lb.	1988.00
113 lb.	2005.75
114 lb.	2023.50
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116 lb.	2059.00
117 lb.	2076.75
118 lb.	2094.50
119 lb.	2112.25
120 lb.	2130.00
121 lb.	2147.75
122 lb.	2165.50
123 lb.	2183.25
124 lb.	2201.00
125 lb.	2218.75
126 lb.	2236.50
127 lb.	2254.25
128 lb.	2272.00
129 lb.	2289.75
130 lb.	2307.50
131 lb.	2325.25
132 lb.	2343.00
133 lb.	2360.75
134 lb.	2378.50
135 lb.	2396.25
136 lb.	2414.00
137 lb.	2431.75
138 lb.	2449.50
139 lb.	2467.25
140 lb.	2485.00
141 lb.	2502.75
142 lb.	2520.50
143 lb.	2538.25
144 lb.	2556.00
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149 lb.	2644.75
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153 lb.	2715.75
154 lb.	2733.50
155 lb.	2751.25
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159 lb.	2822.25
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161 lb.	2857.75
162 lb.	2875.50
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164 lb.	2911.00
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166 lb.	2946.50
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170 lb.	3018.50
171 lb.	3036.25
172 lb.	3054.00
173 lb.	3071.75
174 lb.	3089.50
175 lb.	3107.25
176 lb.	3125.00
177 lb.	3142.75
178 lb.	3160.50
179 lb.	3178.25
180 lb.	3196.00
181 lb.	3213.75
182 lb.	3231.50
183 lb.	3249.25
184 lb.	3267.00
185 lb.	3284.75
186 lb.	3302.50
187 lb.	3320.25
188 lb.	3338.00
189 lb.	3355.75
190 lb.	3373.50
191 lb.	3391.25
192 lb.	3409.00
193 lb.	3426.75
194 lb.	3444.50
195 lb.	3462.25
196 lb.	3480.00
197 lb.	3497.75
198 lb.	3515.50
199 lb.	3533.25
200 lb.	3551.00
201 lb.	3568.75
202 lb.	3586.50
203 lb.	3604.25
204 lb.	3622.00
205 lb.	3639.75
206 lb.	3657.50
207 lb.	3675.25
208 lb.	3693.00
209 lb.	3710.75
210 lb.	3728.50
211 lb.	3746.25
212 lb.	3764.00
213 lb.	3781.75
214 lb.	3799.50
215 lb.	3817.25
216 lb.	3835.00
217 lb.	3852.75
218 lb.	3870.50
219 lb.	3888.25
220 lb.	3906.00
221 lb.	3923.75
222 lb.	3941.50
223 lb.	3959.25
224 lb.	3977.00
225 lb.	3994.75
226 lb.	4012.50
227 lb.	4030.25
228 lb.	4048.00
229 lb.	4065.75
230 lb.	4083.50
231 lb.	4101.25
232 lb.	4119.00
233 lb.	4136.75
234 lb.	4154.50
235 lb.	4172.25
236 lb.	4190.00
237 lb.	4207.75
238 lb.	4225.50
239 lb.	4243.25
240 lb.	4261.00
241 lb.	4278.75
242 lb.	4296.50
243 lb.	4314.25
244 lb.	4332.00
245 lb.	4349.75
246 lb.	4367.50
247 lb.	4385.25
248 lb.	4403.00
249 lb.	4420.75
250 lb.	4438.50
251 lb.	4456.25
252 lb.	4474.00
253 lb.	4491.75
254 lb.	4509.50
255 lb.	4527.25
256 lb.	4545.00
257 lb.	4562.75
258 lb.	4580.50
259 lb.	4598.25
260 lb.	4616.00
261 lb.	4633.75
262 lb.	4651.50
263 lb.	4669.25
264 lb.	4687.00
265 lb.	4704.75
266 lb.	4722.50
267 lb.	4740.25
268 lb.	4758.00
269 lb.	4775.75
270 lb.	4793.50
271 lb.	4811.25
272 lb.	4829.00
273 lb.	4846.75
274 lb.	4864.50
275 lb.	4882.25
276 lb.	4900.00
277 lb.	4917.75
278 lb.	4935.50
279 lb.	4953.25
280 lb.	4971.00
281 lb.	4988.75
282 lb.	5006.50
283 lb.	5024.25
284 lb.	5042.00
285 lb.	5059.75
286 lb.	5077.50
287 lb.	5095.25
288 lb.	5113.00
289 lb.	5130.75
290 lb.	5148.50
291 lb.	5166.25
292 lb.	5184.00
293 lb.	5201.75
294 lb.	5219.50
295 lb.	5237.25
296 lb.	5255.00
297 lb.	5272.75
298 lb.	5290.50
299 lb.	5308.25
300 lb.	5326.00
301 lb.	5343.75
302 lb.	5361.50
303 lb.	5379.25
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Sample sent if desired.

PRICE, \$12 PER DOZEN.

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Country Houses Supplied Cheaply and Certainly for
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Farms. The best Pump for Irrigating, supplying
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Stationary and Swivel Bottoms.
The Best in the Market.

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SPECIAL DRILLS. For Special Work.

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OVER 600 IN USE.

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Cleveland Rolling Mill Co., Ohio.
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Manufacturers of

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W. H. & Co., Albany.....	din 25 c
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Brass and Copper.....	din 25 c
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16 in. ♀ doz. pair.....\$2.75 3 in. ♀ doz. pair.....\$9.00	
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Tarred Sheathing.....	♂ 25 c
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Copper.....	din 40 c
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Carriage in 25 papers.....	din 45 c
Copper.....	din 45 c
Richmond.....	din 45 c
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Rules.—Stanley.....	Boxwood, dia 70 c
Saddlery.—Common.....	
Laundry.....	♂ 25 c
Enterprise.....	♂ 25 c
" Potts.....	din 35 c
Shack Locks.—King & Hutchinson's, new list.....	din 40 c
M. B. & D.....	din 40 c
M. B. & D.....	din 40 c
Shack Weights.—Patent Eye.....	din 40 c
Saws.....	din 40 c
Walker & Clemon.....	din 40 c
Cross-Cut Saws.....	din 40 c
W. M. & C., Common Tenth, No. 1.....	♂ foot 30 c
" Champion.....	♂ foot 30 c
Diston's, Common.....	♂ foot 30 c
" Adirondack.....	♂ foot 30 c
Boylston's Lightning.....	♂ foot 30 c
M. B. & D., Hand Saws.....	din 40 c
Boston's, No. 1.....	din 40 c
Richardson Bros.....	din 40 c
New Blades.—Diston.....	din 40 c
W. M. & C.....	din 40 c
White & Griggs.....	din 40 c
" No. 2.....	♂ doz 40 c
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" Round-Head.....	din 40 c
" Brass.....	din 40 c
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Grillies.....	din 40 c
" Nickel-plated Common.....	din 40 c
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Watrous.....	din 40 c
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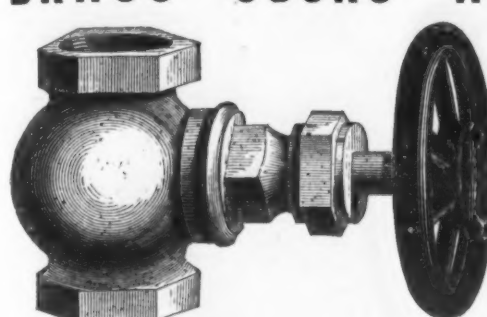
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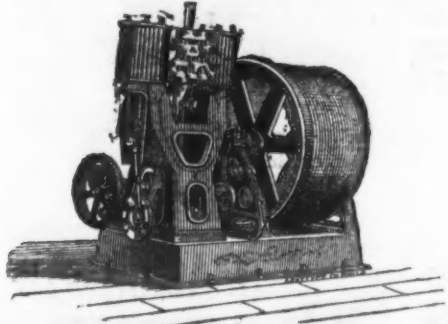
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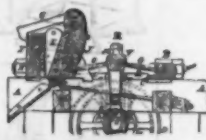
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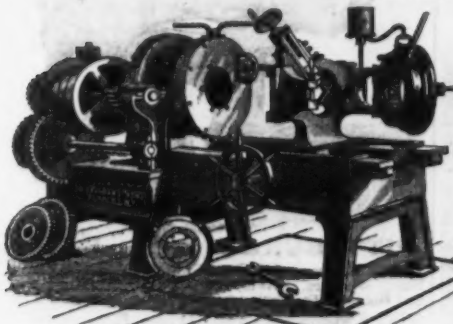


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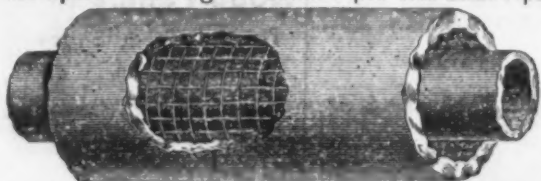


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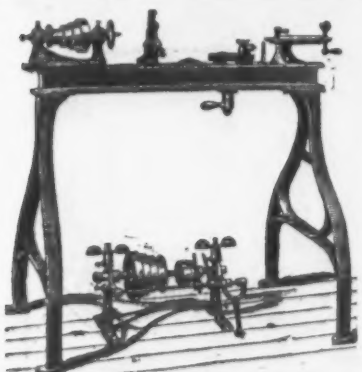
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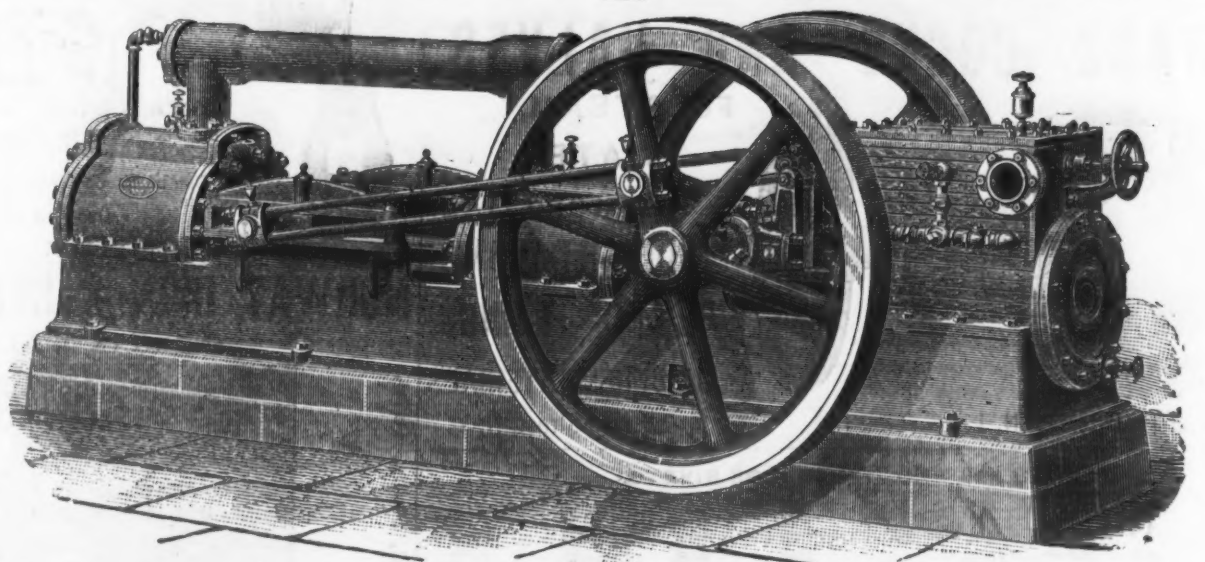
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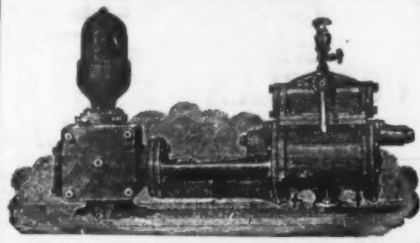
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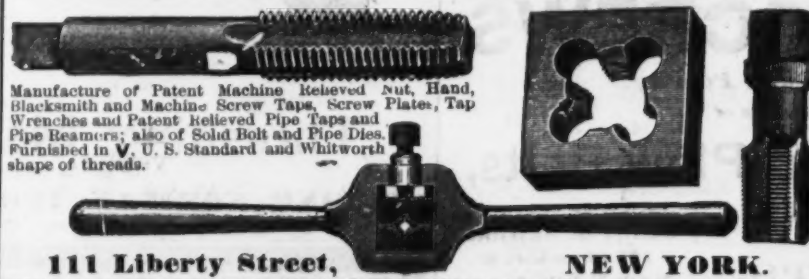
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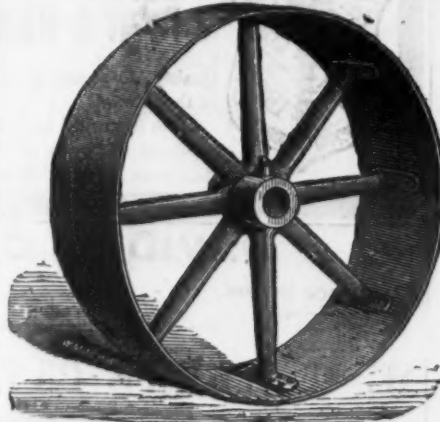


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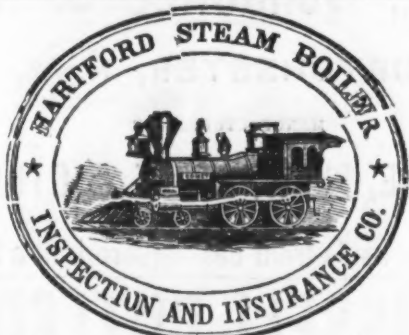
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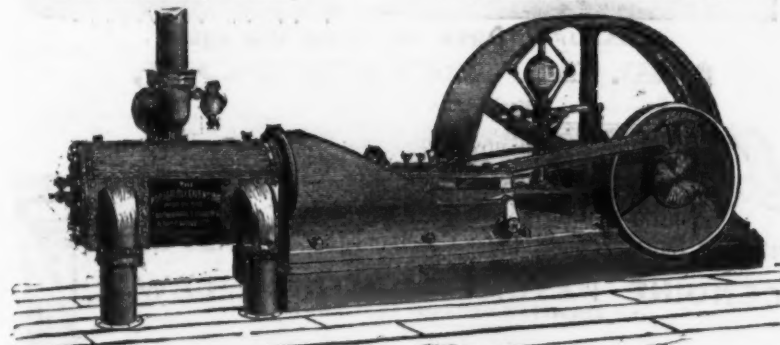
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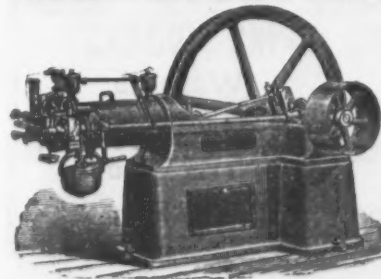
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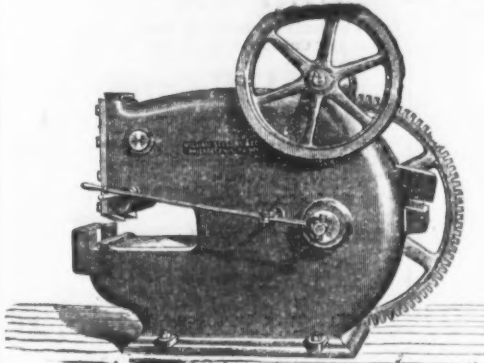
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BRATTLEBORO, VT., May 17, 1881.
JACKSON, MICH., May 20, 1881.
S. H. WARREN, Esq., Brattleboro, VT.—DEAR SIR: Your favor of the 17th inst. at hand. In reply, say it is true. We had a room cave in; had three No. 10 steam pumps submerged instead of two. They were of the kind mentioned in slip.
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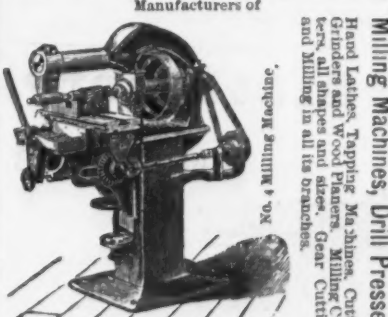
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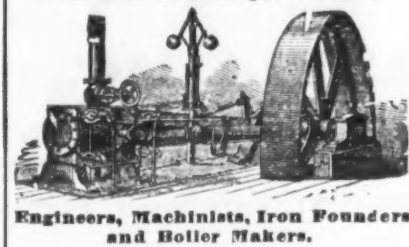
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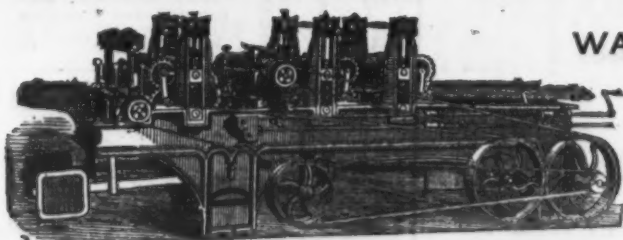
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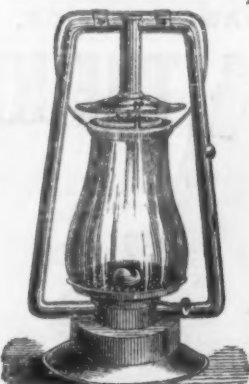
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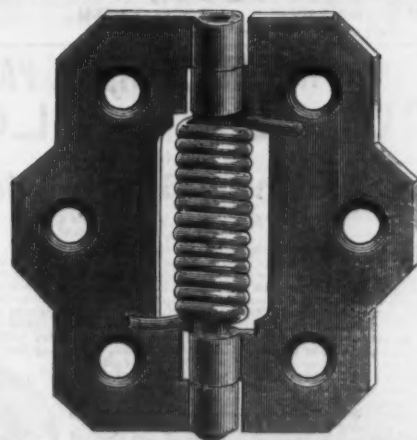
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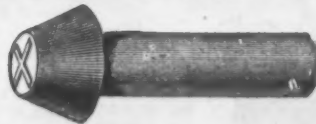
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